THE SOCIAL VALUE OF URBAN NATURE IN SWITZERLAND

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ABSTRACT

This study forms the social science module of the encompassing 'BiodiverCity' project and is explicitly concerned with the development of strategies to enhance biodiversity in Swiss cities while simultaneously enhancing quality of life. The aim is to measure the attitudes of the residents towards different urban green habitat and landscape types, biodiversity, and single flagship species in urban areas. The virtually undefined nature of the relationships between Swiss urban residents and the natural landscapes available to them, suggests the value of a multiple-method research strategy. The research strategy included qualitative interviews, a nationwide survey, and case study surveys in Lugano, Lucerne, and Zurich. Usefulness and accessibility of urban green spaces were found to be of fundamental importance for residents, so measures to enhance biodiversity must include the human dimension. An overlap must be found between preferred habitat variables and preferred landscape variables in that the space must simultaneously provide a vehicle for the residents' desired outcomes, while providing habitats. These are however not incompatible because structural and vegetational complexity is the dominant characteristic of favoured landscape configurations. Preference for particular habitats can also be enhanced by providing information to the public on the ecological benefits of such habitats, such as through the use of flagship species.

ZUSAMMENFASSUNG

Die vorliegende Arbeit untersucht die Einstellung von Bewohnern gegenüber städtischen Grünflächen, um Strategien zur Förderung der Biodiversität menschlichen Bedürfnissen anzupassen. Die Studien basieren auf qualitativen Interviews, einem schweizweiten Fragebogen und Fallstudien in Lugano, Luzern und Zürich. Die Resultate zeigen, dass der Nutzen und die Zugänglichkeit der städtischen Grünflächen essentiell für Stadtbewohner sind. Neben der Befriedigung von Habitatsansprüchen für Tiere und Pflanzen sollen städtische Grünflächen auch die Bedürfnisse der Einwohner erfüllen. Beide Ziele werden mit struktureller Komplexität erreicht. Die Bevorzugung von positiven Habitatstypen kann verstärkt werden, indem die Öffentlichkeit über ihren ökologischen Nutzen informiert wird. Mittels charismatischen Arten überzeugt man dabei besonders viele Menschen.

TABLE OF CONTENTS

CHAPTER 1 GENERAL INTRODUCTION

Introduction

This paper describes a research project which forms the social science module of an encompassing project titled 'BiodiverCity'. 'BiodiverCity' is one of 24 projects contributing to the National Research Programme 'Sustainable Development of the Built Environment' (NRP 54) which aims to develop scientific principles that will help to bring about a more sustainable development of Switzerland's towns and cities. NRP 54 consists of three modules entitled 'Space', 'Infrastructure', and 'Materials and Energy'. This project forms part of the 'Space' module and deals with urban biodiversity and its acceptance by the human population. Dr Marco Moretti from the Swiss Federal Research Institute WSL, Sottostazione Sud delle Alpi, Bellinzona, heads the 'BiodiverCity' project.

The parallel modules of the 'BiodiverCity' project are:

The Ecological Module

The ecological value of urban habitats was assessed using faunistic biodiversity of several groups of invertebrates and vertebrates, including flagship species. Data was collected by several standard methods, and records related to habitat traits at different spatial scales. Study sites were chosen in different urban green habitat types with regard to time and space (age and density of the urban areas, as well different nested spatial scales). Spatial replicates were performed in 3 cities (urban areas), namely Zurich, Lucerne and Lugano.

The Social Science Module

The social science module is specifically concerned with the question of whether residents value a high urban biodiversity and whether it improves their quality of life in the urban area. The stated requirement was to measure the attitudes of the residents towards different urban green habitat and landscape types, biodiversity, and single flagship species in urban areas, as well as the correlation of these attitudes with acceptance and support of conservation measures.

The requirement of working within the framework of a larger project imposed some restrictions on the social science module described in this thesis. The social science module, in light of its mandate to seek methods to enhance acceptance of measures to improve urban biodiversity, was by nature, subordinate to the ecological module. For example, if it happened to have been found that the residents wanted *less* biodiversity, the ecological module did not have the freedom to develop strategies of biodiversity *reduction.* These restrictions were manifest in two major ways.

Firstly, the problem of how to combine the two modules needed to be addressed and the solution was to use the habitat variables of the ecological module as the landscape variables of the social science module. Secondly, the target cities for case studies were selected according to ecological criteria and social criteria were not considered in the selection.

The project received leadership and academic supervision by Dr Marcel Hunziker and Dr Nicole Bauer from the Swiss Federal Institute for Forest, Snow and Landscape Research and received academic supervision by Prof. Dr Bernhard Schmid and Dr Petra Lindemann-Matthies from the University of Zurich, and Dr Peter Hay from the University of Tasmania.

Definition of the Problem

The proportion of the world population living in cities is increasing dramatically, from an estimated 30% in the 1980s, through 50% in the new millennium, to an expected 70% in 2025 (United Nations, 2005). The massive increase in the urbanised population will bring huge changes in the way many of us live our lives. That increasing numbers of people will live, work and play in a predominantly urban environment is known, although the effect that this will have on society and individuals is much less understood.

Switzerland is not immune to this trend of urbanisation and features steadily growing urban areas. Urbanisation brings pressure on space within urban areas as more housing and services are required by the growing populations. Intensification of the built environment, with the understandable aim of preventing the spread of the urban into the surrounding areas, additionally increases the pressure on open space in urban and suburban areas. Furthermore, increasing urbanisation has unknown, yet potentially significant, implications for citizens because of the general lessening of contact with nature. The relationships between social and cultural values, biodiversity and quality of life in urban areas has to be investigated and understood if the consequences of this urbanisation are to be directed towards favourable outcomes.

Aims

The aim of the social science module is to understand the complex set of relationships between urban residents and urban nature. Such an understanding would inform the secondary aim of the study, namely to form strategies to increase the acceptance of measures to enhance urban biodiversity. The final aim is to provide planners with a useful tool in the process of urban development by creation of a model in which identifiable and available data can be input to reliably predict attitudinal outcomes.

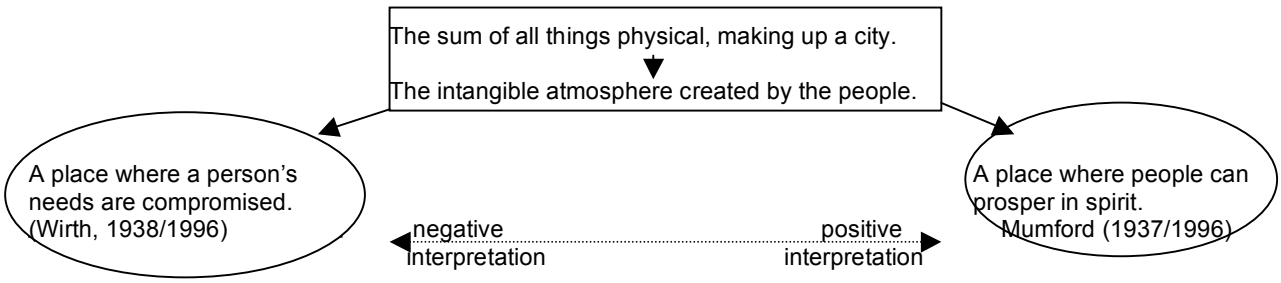
Definitions

Many of the words used throughout this thesis have contended meanings. For most, a place has been found within the text for their definition. Some terms however, because of their frequency and all encompassing relevance, require early definition. Among those are the terms ‘urban’, ‘green spaces’, ‘nature’, and ‘nature quality’.

Urban

Webster’s Dictionary (2006, n.p.) defines urban as an adjective to describe anything either ‘relating to, characteristic of, or taking place in a city’ or ‘constituting or including and centred on a city’. This concise definition suggests that an urban society should therefore be nothing more than simply a society located in a city. However, Webster’s (2006, n.p.) defines urban society as a ‘society that is typical of modern industrial civilization and heterogeneous in cultural tradition, that emphasizes secular values, and that is individualized rather than integrated’. Webster’s (2006, n.p.) inclusion of value judgements in the definition of urban society shows that the author sees ‘urban’ as conferring more meaning than a relative description of the surrounding environment. It is apparent that the wider meaning can be positive or negative depending, as shown in figure 1, on the interpretation of the individual.

Figure 1. Interpretations of ‘Urban’



Mumford (1937/1996, p.179) states that ‘cities are expressions of the human spirit and cities exist to contribute to the ever-evolving human personality’. Mumford (1937/1996, p.185) further argues that a city focuses and intensifies group activity to create ‘social drama’, a desirable state that is lacking in the ‘more benign environment of a suburb’. Mumford’s (1937/1996) interpretation of ‘urban’ is implied by his assertion that a high-density environment with a varied and many-sided life encourages the interaction of socially differentiated groups that in turn creates the social drama desired by humanity.

The opposite point of view is that social drama is not inherently desired but a survival instinct for an urban environment that is failing to meet the social and spiritual needs of the residents. Wirth (1938/1996, p.179) describes urban social relations as ‘impersonal, superficial, and transitory’ with a resulting loss of ‘spontaneous self-expression’, ‘morale’, and ‘sense of participation that comes with living in an integrated society’. Wirth’s implication is that ‘urban’ signifies a state in

which human nature is distorted as an adaptation to the environment, causing the need for social order to be imposed rather than being self-regulating and coming from within.

Urban green spaces

Swanwick *et al.* (2003) report that the terms green space and open space seem to be used interchangeably and, citing others, suggest that there is a need for clarity and consistency in the definition of these terms. Swanwick *et al.*'s solution was to suggest that urban areas are made up of the built environment and the external environment between buildings. The external environment is seen as being composed of two distinct spaces: "grey space" and "green space". Grey space is land that consists of predominantly sealed, impermeable, 'hard' surfaces such as concrete or tarmac. Green space land consists of predominantly unsealed, permeable, 'soft' surfaces such as soil, grass, shrubs and trees. Green space is an umbrella term for such areas of land whether they are publicly or privately owned. It is this broad description of green space that is adhered to in this paper.

Nature

Websters Dictionary (2006, n.p.) offer the rather vague definition of nature as 'the natural physical world including plants and animals and landscapes etc.' Hay (2002) points out that 'nature' is often claimed to have no objective existence and that it is merely a 'social construct'. Such claims extend to all of nature and are quite rightly contended, given that natural processes continue to occur in all urban areas, sometimes despite determined efforts by humans to stop them. Localised urban areas often contain a mix of cultural and natural processes (Hay, 2002) and an individual can assess any particular landscape by viewing it on a continuum with the extremes as cultural, and natural, although the position assigned by the individual on this continuum is largely subjective. In this proposal, localised urban areas will often be referred to as 'urban landscapes' although Bourassa (1998) points out that landscape itself is a contended term. However, there seems to be some consensus that environment becomes landscape once it has been perceived, which reinforces the argument that subjectivity plays a role. While nature clearly does objectively exist, people's understanding of what constitutes nature is so varied and so personal that the classification of a landscape as either natural, cultural or mixed is individually constructed.

Nature Quality

This project is explicitly concerned with perceptions of nature, which introduces the issue of nature quality. While it is acknowledged that nature quality has a scalar dimension, this proposal is limited to urban nature so any definition must therefore be limited to the scale found within urban environments. Similarly, it is unlikely that urban nature can be totally free of the influence of humans, so human influence forms a parameter of any definition of urban

nature quality. It is tempting to define high quality nature as being simply species rich, in other words, high in biodiversity, although this definition is also value laden.

Biodiversity is often defined as the variety of all forms of life, from genes to species, through to the broad scale of ecosystems (Faith, 2003). However, Callicott et al. (1999) described 'biodiversity' as a normative concept and point out that it can be approached from either a 'functional' or 'compositional' perspective. 'Functional' is oriented towards ecosystem and evolutionary processes, while 'compositional' is oriented towards categorisation into groups such as species, populations, and communities. A further complication is that the meaning of biodiversity can include judgements about the process and goals of biodiversity conservation (Faith, 2003). Such pluralism may however be necessary at this operational level in which the values of society play a direct role. It is not unusual to find the presence of introduced species held as examples of the antithesis of conservation and therefore undesirable, yet the presence of introduced species, unless they remove a greater number of native species, must contribute to species richness.

What is clear is that a definition is needed and that a position must be taken. Sarkar and Margules (2002) point out that elements of accepted convention are almost always included in theoretical reasoning in science. However 'convention' does not imply 'arbitrary' but 'means that there were choices to be made, no single option was dictated by the facts at hand, and a choice was justified instrumentally by its ability to achieve the purpose for which it was intended' (2002, p. 307). This philosophy allows the choice of which of Callicott et al.'s (1999) approaches would be most suitable in the context of this proposal. A city is a high-density environment with a varied and many-sided life (Mumford, 1937/1996) so, for the purposes of this proposal the compositional approach will be taken and the quality of nature will be described by diversity of species present, regardless of whether they are introduced or native species.

Methodology

Academic debate continues on the issue of whether human behaviour can be studied scientifically and whether the social sciences can rightly be called sciences (Babbie, 1989) This study is grounded, to further cite Babbie (1989, p.30), 'in the position that human social behaviour can be subjected to scientific study as legitimately as the physicist's atoms or the biologist's cells'. Rossi and Freeman (1989) point out the importance of accurately defining the questions to be answered when designing a social research project. The following questions form the foundation of this study.

The Management Questions

How much nature, and in which quality, do urban residents in Switzerland need, in order to perceive an adequate quality of life?

How can the acceptance by residents of Swiss cities of measures to maintain and/or improve biodiversity within Swiss cities, be enhanced?

Research Questions and Hypotheses

Research questions and hypotheses were developed after a review of relevant literature, with relevance guided by the applicability to the management questions. The decision to structure these explanations with the questions and hypotheses stated first, and with the literature reviews described as 'justification', is made for the benefit of the reader and does not reflect the order in which the study was approached. This summary is structured around the specific research questions and hypothesised answers and includes the theoretical justifications of why particular approaches were taken to address the questions and how the hypotheses were reached. The justifications are given more attention than the methodology because the latter is discussed more fully in the relevant chapters of this thesis themselves, however the data collection approaches are also described.

Research question 1: Which external influences have a role in the development of a worldview?

Hypothesis 1: An individual's ecological worldview is mediated by culture, knowledge and familiarity with nature

Hypothesis 2: Residents of different regions within Switzerland have different worldviews

Justification of question 1 and hypotheses 1 and 2.

A considerable body of literature connects attitudes towards specific environmental concerns with the underlying values held by the individual, and the Rokeach/Schwartz tradition takes a position of dominance (Dietz et al., 2005). Schwartz, extending the work of Rokeach developed a values scale that has been widely tested in a variety of contexts and consistently finds 10 basic value types, labeled power, achievement, hedonism, stimulation,

self-direction, universalism, benevolence, tradition, conformity, and security (Schwarz & Boehnke, 2004). These ten types are grouped into four clusters that reflect two dimensions, one of which is labelled self-enhancement versus self- transcendence. This dimension describes the dichotomy of self-interest and altruism but makes no distinction between humanistic and biospheric altruism.

Merchant (1992) suggested that individual or societal environmental practices will be consistent with the ethical grounding to which individuals or societies adhere. She extended the ideas of Leopold (1949/2005) and proposed three domains for environmental concern labelled egocentric, homocentric altruism, and ecocentric altruism. Egocentric describes environmental concern on the basis that the individual gains direct benefit and has a derived interest in its preservation. Homocentric altruism describes environmental concern on the basis that society benefits from its preservation. Ecocentric altruism describes a belief that nature is inherently valuable in and of itself.

Axelrod (1994), departing from the Rokeach/Schwartz approach, held that such beliefs are deeper seated and are in fact base values. He developed a similar taxonomy that specified three value domains, labelled universal, social, and economic and found that he could clearly link individuals' values with the likelihood of endorsing environmentally protective actions. Axelrod's taxonomy differed in that there was no inherent valuation of nature connected to the social and economic value domains. Stern & Dietz (1994) proposed a social psychological model that presumed that the pursuit of environmental quality could stem from any of three orientations labelled egoistic, social altruistic, and biospheric. Schultz (2000) independently identified a clear three-factor structure of environmental concern, which he similarly labelled egoistic, social-altruistic, and biospheric. Kortenkamp & Moore (2001) appear to combine egoistic and social altruistic under the title anthropocentric in their three-system model of moral reasoning. However, similarly to Axelrod, they include non-environmental reasoning, which argues from a position independent of nature, such as social contracts or truthfulness.

Stern & Dietz (1994) found that the biospheric orientation did not differentiate from social altruism in a general population sample, implying that the overlap between these orientations was sufficient that they are difficult to separate. Axelrod (1994) conceded that, although each domain is presumed to be independent, overlapping values among the domains are a possibility but had little difficulty separating the social and universal constructs. However his sampling method deliberately selected participants with a recognisable dominant orientation and his experiment appears to have tested beliefs rather than values. Carlsen et al. (2001) point out that environmental dilemmas can only occur under conditions of an internal conflict being applied to a decision, explaining that if an individual's values are aligned, there is no

dilemma. This assertion changes Axelrod's (1994) possibility of overlapping domains into a certainty and contradicts assumptions of independent domains.

Given that environmental beliefs include an inherent valuation of the environment and that they differ from attitudes only in terms of generality, Dunlap & van Liere (1978) prefer to use the term 'environmental worldview' in place of 'environmental beliefs'. There appear to be strong similarities between the various typologies and there seems to be agreement that humans possess a combination of social oriented, environmentally oriented, and self oriented domains of environmental beliefs. The challenge however remains to find an explanation of the respective influence of social-altruism and biospheric beliefs on environmental attitudes and whether they are indeed separable constructs. The argument that environmental worldviews are personal to us and are constructed from inherited values mediated by external influences (Bem, 1970, Dietz et al, 2005, Steg et al. 2005) appears to be convincing and an examination of possible external influences is warranted.

Research question 2: What are the roles of urban nature in Switzerland
Research question 3: How are those roles assigned?
Hypothesis 3: The ecological worldview held by an individual predicts of the role they assign to urban nature.

Justification of questions 2 and 3, and hypothesis 3.
Although Rokeach (1973) proposed that values transcend specific situations when guiding the selection of behaviour, Ajzen's (1985) subjective norms, which lead to the formulation of, among other things, an environmental attitude, suggest that context has a role in the formation of behavioural intention. However, in the case of urban nature, it can be argued that context is manifest in the assigned role of nature, and thus included in assessment of the environment in question. Winter (2005) described means of valuation of contended natural areas as being related to roles assigned by the valuer, yet little study has been carried out into the roles of urban nature with most claims made on the basis that they are self-evident. Shin et al. (2005), on the basis of their empirical study in Korea, strongly suggested that the roles assigned to nature by individuals define their interaction and consequently their attitudes towards nature. It is not clear however, how an individual chooses which roles nature will play, although the influence of one's worldview on personal interactions with nature raises the suspicion of a relationship between worldview and assigned role. This view betrays an anthropocentric perspective, which is justified given that this study is explicitly interested in urban human/nature relationships. The contrasting biospheric perspective holds that nature's role is simply to exist, independently of human opinion.

The possible roles identified in the literature are restoration, self-actualisation, recreation, education, and socialisation. Godfrey-Smith (1979) identified four roles that, from an anthropocentric perspective, wilderness could play, which he labelled the cathedral, the silo, the laboratory, and the gymnasium. The roles identified in the preliminary interviews appear to be in general agreement. *Restoration* and *Actualisation* fit within the cathedral argument, *Recreation* fits within the gymnasium argument, and *Education* fits within the laboratory argument. Shin et al.'s (2005) study into the benefits perceived by Korean visitors to urban nature areas identified three roles, which they labelled learning, social and self development, and enjoying nature. Their results were consistent with Tinsley et al.'s (2002) previous studies carried out in the United States, which suggests a transcendence of culture. In the case of urban nature, by definition located within a predominantly cultural environment, the silo argument does not seem to apply but in its place *Socialisation* can be added.

Restoration applies to both physical and mental health and wellbeing and involves renewing diminished functional resources and capabilities (Hartig and Staats, 2003). The Attentional Restoration Theory (being away, extent, fascination, and compatibility) of Kaplan & Kaplan (1989) proposes that nature has properties that attract involuntary attention, thus allowing directed attention to recover and thereby reduce mental fatigue. The Aesthetic and Affective Response theory of Ulrich (1983) similarly claims that natural environments encourage restoration and reduce stress. Studies have consistently shown that natural environments are more restorative than urban environments (Ulrich, 1983) although most have contrasted stark urban environments with natural scenes (Staats et al., 2003; van den Berg et al., 2003; Ulrich et al., 1991), or compared the effects of natural views with the effects of windowless rooms (Hartig et al., 1997). Hernandez and Hidalgo (2005), in one of the few studies examining the restorative effects of nature within cities, similarly found that respondents viewing urban scenes with natural elements returned higher scores on a measure of restorativeness than those viewing the same scenes without the natural elements. Peron et al. (2002) found that mixed environments are often perceived as being as restorative as purely natural environments. Although there is insufficient evidence to conclude that urban nature plays a restorative role, there are suggestions that it might. Furthermore, there is evidence to suggest that nature can actively increase mental well being rather than simply provide a vehicle for recovery.

Self-actualisation literally means to fully realise ones potential and was used in the humanistic psychological sense by Maslow (1968) as the pinnacle of his hierarchy of needs. Maslow's (1968) self-actualised person is one who is fully functioning and living an enriched life, or in other words, an ideal of mental health. It is differentiated from the related construct of restoration in that actualisation has a connotation of improvement while restoration has a connotation of recovery.

Godfrey-Smith's (1979, p.310) cathedral argument is that wilderness provides opportunities for 'spiritual renewal, moral regeneration, and aesthetic delight'. Kaplan & Kaplan (1989) observed several benefits of their 'wilderness laboratory' that appear to contribute to self-actualisation such as self discovery, inner peace, acquaintance with ones own thoughts, and contemplation of spiritual meanings and eternal processes. Bauer (2005) also observed characteristics that could be argued to contribute to self-actualisation, namely fascination and feelings of well being as being associated with perceptions of wilderness in her study of Swiss residents. Young & Crandall (1984) found direct positive correlations between wilderness use and self-actualisation. This leads to questions of scale as no study has yet examined whether total immersion in wilderness is required to gain feelings of life enrichment although Beatley (2000) sees the provision of opportunities for personal enrichment as a compelling argument for green urbanism.

Urban nature can also be seen as a contributor to physical health in that natural environments within an urban area encourage residents to exercise. Godfrey-Smith's (1979) gymnasium argument was that wilderness provides opportunities for 'athletic or recreational activities'. Beatley (2000) echoes this point by arguing that urban green spaces empower individuals and families to change in meaningful ways, which suggests that the gymnasium argument applies to the smaller scale urban nature. These arguments provide sufficient evidence to suspect that urban nature plays a recreational role.

Godfrey-Smith's (1979) laboratory argument was that wilderness provides subject matter for scientific enquiry. Shaw (1987) found that untended, or wild, areas are valued more by children than manicured open areas and that a wider variety of spatial situations encouraged play and exploration. Brennecke (2006) observed a similar preference in adults selecting outdoor meeting places. Shin et al. (2005) found that the desire to learn was among the most important roles filled by Korean urban forest parks. Little study has however been undertaken to learn whether this education role can, or has been, filled by smaller scale urban nature.

Driver (1991) argued that the social element of forest recreation is one of the most consistently important motivations for forest visitation although previous studies on the social outcomes of forest recreation have focused on family bonding and friendship during journeys to forests (Shin et al., 2005). Urban green spaces can be expected to feature differences of scale and intensity of visitation. It can therefore be suspected that they may provide the role of meeting place as well as a destination for family outings. Coley et al. (1997) found that natural elements, such as trees, in semi public spaces surrounding urban housing promote increased use by, and interaction between, residents. Schweingruber (2006) agrees by noting that green oases connect people. Urban green spaces that are well used have been

shown to encourage bonding between neighbours (Kuo et al. 1998), provide a greater sense of safety (Kuo et al., 1998), and reduce urban ills such as crime and violence (Kuo and Sullivan, 2001).

Research question 4: Is there a species suitable for flagship status?
Research question 5: Does knowledge of the presence of a flagship species have the ability to enhance preference for habitats that encourage biodiversity
Hypothesis 4: Presence of a flagship species enhances appreciation of urban landscapes.
Hypothesis 5: Presence of an uncharismatic species does not enhance appreciation of urban landscapes.

Justification of questions 4 and 5, and hypotheses 4 and 5.
The approach adopted by this study, that assessment is made by comparing expectations with perceptions, suggests that a predisposition for change of opinion about a particular landscape will occur when expectations are not met. Van den Berge & Vlek (1998) point out that people have a tendency to avoid risk, often despite apparent advantages in change, so it can be concluded that the pressure gradient must be reasonably steep to elicit a predisposition or change.

However, there is evidence in the literature that logic is not the only factor. Kals et al. (1999) point out that the rational/cognitive approach is inadequate to predict attitudes because of its inherent lack of emotional dimensions. Hay (2003, p.2) strongly reinforces this by writing 'that the wellsprings of a green commitment- at both the activist and more passive levels of identification- are not, in the first instance, theoretical; nor even intellectual. They are, rather, pre-rational' and nominates perceived loss of biodiversity as 'the most potent greening agent'. Kals et al. (1999) similarly identify indignation about insufficient nature protection as a powerful predictor of an environmental attitude.

Schultz (2000) demonstrated that perspective could influence environmental concern by showing that people instructed to take the part of an animal when assessing landscapes, scored higher on a scale measuring the degree of biospheric environmental concern than participants who were asked to remain objective. This animal could be described as a flagship species. Simberloff (1998, p.247) describes flagship species, normally a charismatic large vertebrate, as 'one that can be used to anchor a conservation campaign because it arouses public interest and sympathy'. While the presence of a particular species may influence perceptions, and therefore assessment of a natural landscape, it falls within the definition of a flagship species when it influences a predisposition towards change. Simberloff (1998) is careful to point out that flagship species do not necessarily represent

healthy eco-systems. Indeed, creatures that arouse sympathy in an individual, chosen on emotional rather than logical grounds, may even be detrimental to ecosystems.

Data collection approaches

The decision of which research method to choose is usually dominated by the appropriateness of quantitative or qualitative methods (Reichardt & Cook, 1979) . Quantitative methods are grounded in the positivist paradigm (Reichardt & Cook, 1979) and have come to mean the collection of data appropriate for statistical analysis (Babbie, 1989). Qualitative methods are grounded in the normative paradigm (Reichardt & Cook, 1979) and have come to mean the collection of data not easily reduced to numbers (Babbie, 1989). However Jick (1979, p.602) points out that a combination of the two methods can 'capture a more complete, holistic and contextual portrayal of the unit under study'. The combination of methods in the study of the same phenomenon is termed triangulation and can be used to test the reliability and validity of research (Jick, 1979). Reichhardt & Cook (1979) suggest that, subject to resources, triangulation is appropriate when a comprehensive evaluation is desired however, a specific research situation may be suited to one method or the other.

Qualitative study might provide a rich source of data, and has the potential to reveal constructs that the researcher had simply not thought of. Silverman (2001) argues that the status that is to be attached to the collected data must be considered when selecting an appropriate method of data collection. Interview respondents can be considered to be sources of data or alternatively, as providers of actively constructed narratives. In other words, do we take a positivist or a constructivist perspective? Holstein and Gubrium (2004) argue convincingly that all interviews are active and that knowledge is constructed in association with interviewers. In the context of this study, the construction of the narrative is precisely what we are interested in so the choice of the constructivist perspective is clear.

Cognitive mapping, developed by Axelrod (1976) and applied to landscape preference by Steven (2006) looked promising but seemed to concentrate on which physical details are noticed and additionally required a common language and protocol. Focus groups and Concept mapping (Novak & Canas 2006) looked similarly promising, however both data collection techniques also rely on a common language and protocol, and concept mapping also requires drawing ability. Provision of a researcher-created language and protocol would defeat the purpose of the study, which is to learn how the respondents construe the urban landscapes*,* and there is no evidence to support the assumption of a common language.

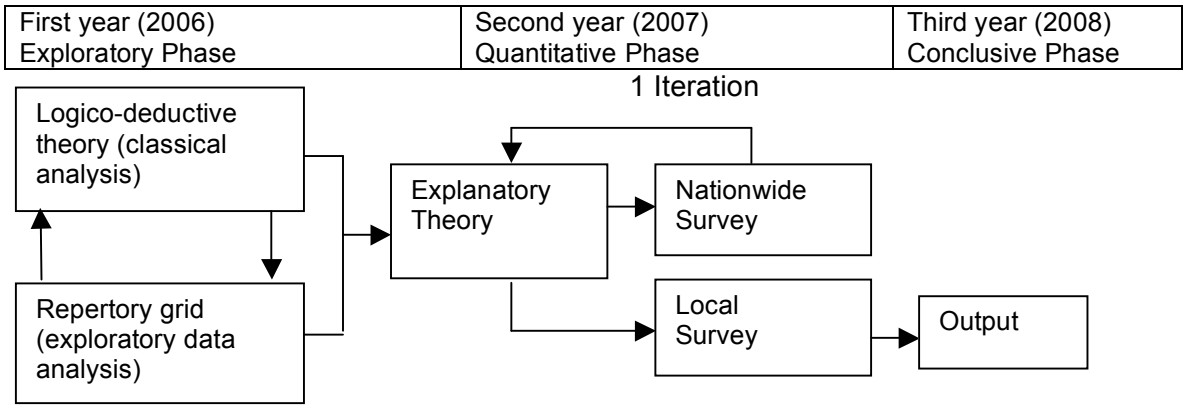
Kelly (1955/1991), remaining within the constructivist movement, developed a plausible theoretical foundation, which he called Personal Construct Theory and an associated practical technique to apply the theory, which he called the repertory grid. Kelly (1955/1991)

suggests that the way we construe, and make sense and meaning of the world, can be expressed by way of contrasts. He also suggests that a strategy to find what people think is to enter into a discussion with them, thus solving the problem of shared language. Personal Construct Theory appears appropriate for study into the perceptions of landscapes in general and for this study in particular.

The logico-deductive method is a system of inference where conclusions (new knowledge) follow from premises (old knowledge) through the application of sound arguments and is based on the principle that nothing can be deduced if nothing is assumed. Proponents of grounded theory argue its superiority over the logico-deductive method of theory generation because of the requirement that theory fit the data instead of vice versa (Dick, 2005). However the claim of superiority is based upon the assumption that theory gleaned from the literature will be wrong, otherwise it would also fit the data. Differences between grounded theory and logico-deductive approaches to research end once theory has been generated with both advocating quantitative testing of theory, although with different opinions as to the reasons for testing (Kennedy & Lingard, 2006).

The virtually undefined nature of the relationships between Swiss urban residents and the natural landscapes available to them, suggests the value of a multiple-method research strategy. This proposal will suggest a triangulated method of theory development, adopting an exploratory data analysis (EDA) approach in which data collection is immediately followed by analysis with the goal of identifying relevant constructs. The EDA approach is complemented by a classical analysis of existing literature, in an iterative process, leading to the development of specific research questions and hypotheses. The research strategy tested the emergent theory according to the principles of classical data analysis, in a large population sample and the results of testing were re-applied to further theory refinement. Finally the resultant theory was tested in the specific study areas of Lucerne, Zurich and Lugano. Figure 1 shows a diagram of the process of theory generation and application.

Figure 1: Research Strategy



Data collection for question 1 and hypotheses 1 and 2.

Research question 1 asked which external influences have a role in the development of a worldview? Several scales to assess public attitudes toward general environmental issues have been developed. Examples include Dunlap & Van Liere's (1978) 'New Environmental Paradigm' (NEP, later refined by Dunlap et al. (2000) which measures an ecological worldview, Maloney et al.'s (1975) 'Ecology Scale', which measures ecological attitudes and knowledge, Stern et al.'s (1993) self descriptive 'Awareness of Consequence Scale', Weigel & Weigel's (1978) 'Environmental Concern Scale', which measures environmental concern and the behavioural adaptations that people are willing to make, and Steel et al.'s (1994) 'Forest Values Scale', which measures attitudes toward forest resources along an anthropocentric to biocentric continuum. It appears that Dunlap et al.'s (2000) NEP scale may be the most appropriate selection for this study although Home (2005) developed a 10 item scale, modelled on Axelrod's (1994) approach, which was used to predict attitudes to environmental dilemmas. Both approaches can be deemed relevant to the topic under study, however use of the NEP scale would allow comparison with the results of international studies.

Data collection for questions 2 and 3, and hypothesis 3.

Research questions 2 and 3 ask what are the roles of urban nature in Switzerland and how are those roles assigned? Shin et al.'s (2005) psychosocial outcomes measure was selected since it is one of the few studies to address psychosocial outcomes and a repetition of this scale would allow international comparison.

Data collection for questions 4 and 5, and hypotheses 4 and 5.

Research question 4 asked if there is a species suitable for flagship status? This question was addressed in the first (nationwide) survey using a choice based experiment when pairs of birds were presented so that one variable could be discerned between them. Research question 5 asked whether knowledge of the presence of a flagship species does have the ability to enhance preference for habitats that encourage biodiversity. To address this question, a quantitative experiment was undertaken in which all respondents were asked to rate an identical series of scenarios. Two groups were treated with information about either a charismatic species or a supposedly less charismatic species while a control group was given no additional information. A comparison of the ratings of the various scenarios given by those from each of the three groups allowed conclusions as to the effects of the treatments.

Outline of the thesis

In **SECTION 1**, the inductive phase is described and the results are used to generate a preliminary theory with associated hypotheses.

In **chapter 2** we seek to gain an initial understanding of the complex relationships between people and their environment is difficult by identifying constructs that are relevant to people when considering urban green spaces. The practical application of the repertory grid method is described and the results, which revealed a dominant anthropocentric attitude towards urban green spaces, are outlined. The universal anthropocentric perspective allows the interpretation that residents see Zurich essentially as a place for people and furthermore see green spaces as places for themselves to pursue their own interests.

In **chapter 3** we further explore the results of the qualitative interviews to seek evidence of whether our appreciation of nature is innate and inherently human, is cultural and something that we learn, or is a mixture of both. Preferred urban landscapes were contrasted with rejected landscapes and an analysis using principle components analysis and multi-dimensional scaling revealed a clear separation of cultural and biological modes of landscape assessment in some respondents. The research contributes to an understanding of the meanings of urban green spaces and suggests that cultural context is important when designing interventions.

In **SECTION 2,** we will examine the results of nationwide and case study surveys and see whether the explanatory theory needs revision in the face of rejected hypotheses.

In **chapter 4**, we seek to measure whether cultural background influences the ecological worldview held by an individual by assessing their endorsement of Dunlap et al's (2000) New Ecological Paradigm (NEP). Also in this chapter we seek to measure, using a variety of regression methods, whether the worldview in turn influences local scale pro environmental attitudes or behaviour such as interest in natural areas for recreation and membership of an environmental organization. Although three items were removed from the scale due to a lack of internal consistency, endorsement, or rejection, of the adjusted NEP was found to be a useful predictor of local scale pro environmental attitudes or behaviour. Measurement of endorsement of the adjusted NEP can thus contribute to matching management strategies with the wishes of stakeholders.

In **chapter 5,** we examine the motivations, which can also be described as the outcomes that people wish to achieve, for interacting with nature. Furthermore we examine the activities that people undertake in natural areas to see whether there is a match between activities and outcomes. It was found that people select natural places for activities with the aim of achieving multiple psychosocial outcomes. This multiple function, from an anthropocentric perspective, underlines the complexity of the task of planning and managing natural landscapes for users.

In **chapter 6,** we address the question of whether provision of information has the ability to influence preferences for urban landscapes that include habitat variables. It was found that information about the liklihood of attracting a charismatic species positively influences public attitudes towards landscapes containing habitat variables. Furthermore it was found that an uncharismatic, yet ecologically important, species can also adopt this roll, which suggests that information about ecological importance can add charisma. These results may be used to enhance acceptance of measures to increase biodiversity. To achieve ecological goals, the species chosen as a motivation should be selected specifically for the particular goal and with consideration of the local context.

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SECTION 1 INDUCTIVE PHASE

CHAPTER 2

Constructing Urban Green Spaces: An Application of Kelly's Repertory Grid

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Abstract

Urban green spaces are valuable to residents for a variety of reasons and some degree of management is needed to ensure at least their preservation, if not enhancement, in a rapidly urbanising society. Intensification of the urban environment brings pressure upon the undeveloped spaces within a city and an understanding of the needs of residents is needed if green spaces are to be managed in alignment with their wishes, so that changes will be accepted. However, gaining such an understanding of the complex relationships between people and their environment is difficult. Constructs may exist that researcher, respondent, or both have not yet articulated. The repertory grid method is described as an approach that addresses this problem by researcher and respondent collectively creating a survey instrument, which the respondent then completes. The repertory grid technique was applied in Zurich and revealed a surprisingly dominant anthropocentric attitude towards urban green spaces. The universal anthropocentric perspective allows the interpretation that residents see Zurich essentially as a place for people and furthermore see green spaces as places for themselves to pursue their own interests.

Introduction

Intensification of the urban environment in a rapidly urbanising society brings pressure upon the undeveloped spaces within a city. There is little disagreement that urban green spaces are valuable to residents for a variety of reasons and that some degree of management is needed to ensure, at least their preservation, if not enhancement. This paper begins from the assumption that acceptance by residents is a key to the success of any intervention strategy to enhance or protect nature in urban environments. It is reasonable to assume that management interventions in urban green spaces will be more likely to be accepted if they are seen to align the green space with that desired by residents. Therefore an understanding of what residents want is a prerequisite to maximising acceptance, which in turn requires an understanding of what they perceive when they consider a particular green space. The aim of this paper is to describe the application of a method used to learn the range of constructs used by residents of Zurich, Switzerland when considering urban green spaces and, in so doing, to examine the desired state, from the resident's perspective, of urban green spaces in Zurich. Such knowledge will contribute to a greater understanding of the complex set of relationships between urban residents and urban nature.

Determining how people perceive urban nature is problematic. Constructs may exist that researcher, respondent, or both have not yet articulated. Some ways in which the research questions may be answered are outlined and the reasons for selecting personal construct theory are explained. The repertory grid method is described as an approach that addresses this problem by researcher and respondent collectively creating a survey instrument, which the respondent then completes. Immediate statistical analysis of the results allows the creation of a concept map, which can then be checked for accuracy with the respondent. The repertory grid technique was applied to the topic of urban green spaces in Zurich and produced a range of findings that further understanding of how residents assess whether green spaces meet their needs. The paper concludes with a summary of the constructs and some implications for those seeking to manage such spaces. Firstly however, some background information is needed to provide context.

The proportion of the world population living in cities is increasing dramatically, from an estimated 30% in the 1980s, through 50% in the new millennium, to an expected 70% in 2025 (United Nations 2000). Increasing numbers of people will live, work, and play in a predominantly urban environment, although the effect that this will have on society and individuals is little understood. It can however, be expected that the increase in the urbanised population will bring changes in the way many of us live our lives. Switzerland is not immune to this trend of urbanisation and features steadily growing urban areas (Schuler & Perlik 2004). Urbanisation brings pressure on space within urban areas, as the growing populations require more housing and services. Intensification of the built environment, with the

understandable aim of preventing the spread of the urban into the surrounding areas, additionally increases the pressure on open space in urban areas and managers can be expected to experience pressure from an increasing number and variety of stakeholders.

The Purpose of City Greenspaces

The practical benefits that humans derive, directly or indirectly, from urban nature are described as 'ecosystem services' (Costanza et al. 1997). Ironically it is often the unseen nature that provides the direct services such as pollination of garden plants by insects. An example of an indirect benefit is the feeling of wellbeing that we get when we consider that our city does indeed host some attractive and esteemed species, such as hedgehogs. We might never see one, but it feels good to know that they are there. Similarly, it is not always necessary to actually go to nature to receive feelings of wellbeing but it is essential to know that one could if one wanted to. The knowledge that it is there can be as important to city residents as the direct uses that they gain from it. Bolund & Hunhammer (1999) point out that the health of the urban ecosystem (often represented by higher plant diversity) is directly proportional to both the direct and indirect benefits to the human population. The principal argument for the preservation of nature within cities however, is that it provides a restorative contrast to the built environment.

Studies have consistently shown that natural environments are more restorative than urban environments (Ulrich 1983) although most have contrasted stark urban environments with natural scenes (for example Staats et al. 2003; van den Berg et al. 2003; Ulrich et al. 1991). Studies examining the restorative effects of urban green spaces have similarly found that respondents viewing urban scenes with natural elements returned higher scores on a measure of restorativeness than those viewing the same scenes without the natural elements (Hernandez & Hidalgo 2005; Peron et al. 2002). While it can be reasonably concluded that urban green spaces do have a beneficial role within our cities, there is less apparent consensus as to how these spaces should be managed and what conditions residents desire. Knowledge of the desirable conditions is particularly important in the context of urban green spaces because of the intensity of use and the high degree of community/nature interaction.

Political Perspective of City Greenspaces

Grün Stadt Zürich (2006), an organization within the Zurich local government charged with management of green spaces within Zurich state that the easily accessible and nature-like urban green and leisure spaces and recreation areas within the city and surrounds contribute to a high quality of life. Through increasing use pressure, and through the densification of the city, the green and leisure spaces are increasingly placed under pressure. Grün Stadt Zürich (2006) has set itself the task of preserving these green and leisure spaces and

simultaneously tailoring management to the needs of the population. However assessing the needs of the population can be difficult. Forester (1998, p153) describes the day-to-day reality of public consultation in planning as being complex and potentially misleading.

> 'Suggestions of "interest" and "community" are constantly put forward and interpreted, constructed and reconstructed; they are politically up for grabs, even though some can usually grab more than others. So even when some groups are more organized, when some have more access, information, and expertise than others, senses of "interest" and "community" alike will often be multiple, internally conflicting, ambiguous, and evolving - a messy and fluid situation which presents planners with potential confusion.'

However this is the environment within which planners usually operate.

The commonly used synoptic model for resource management is an expert driven approach and consensus on a singular objective is often implicitly assumed (Lachapelle et al. 2003). Assumptions of desired characteristics of urban nature include that diverse and healthy ecosystems constitute 'better' nature (Miller 2006). Wilson (1993) proposes an innately, and genetically transferred, emotional affiliation of human beings to other living organisms that would seem, in his eyes, to be a universal human characteristic, which he labels 'biophilia'. Callicott (1993) interprets Darwin's theory of evolution as agreeing that biophilia has been naturally selected in our prehuman ancestors as part of the mechanism for bonding into mutually beneficial communities. A driver in the mechanism of bonding is the advantage that we receive by behaving within the social demands of our communities, which inherently involves consideration of the needs of others (Dietz et al. 2005). Callicott (1993, p10) asserts that 'the next stage of human moral evolution' would be to extend this feeling to 'fellow members of the biotic community', or in other words to develop biospheric altruism. Given that we are genetically programmed to like nature, and that our genetic predisposition to behave socially is reinforced by culture, it would seem that Miller's (2006) assumption is reasonable.

A further assumption is that the desired characteristics of urban green spaces in Zurich include providing a means for people to pursue their individual recreational and social needs (Schweingruber 2006). In other words they should be useful spaces. Schumaker & Taylor (1983) point out that spaces that are used by people, and satisfy user needs, contribute to a relationship they describe as functional place attachment. Winter (2005) described means of valuation of contended natural areas outside urban environments as being related to roles assigned by the valuer, which also has an implication that the usefulness to the individual is important. Shin et al. (2005) and Tinsley et al.'s (2002) studies into the benefits perceived by visitors to urban nature areas identified that roles, including learning, social development,

and self-development contribute to the valuation of urban nature. However, insufficient study has been carried out into the roles of urban nature for generalisations to be made and claims that urban green spaces should be useful appear to be made on the basis that they are self-evident.

While expert opinion of the desired conditions is informative, and indeed necessary, it sheds little light on the actual conditions desired by the community, and some means of integrating stakeholder opinion is needed (Dinsdale & Fenton 2006; Lachapelle et al. 2003). Matthies & Kroemker (2000, p 65) comment on the widely held assumption that management should "optimally be tailored to the specific situation by involving the target group right from the planning stage of the intervention". They have essentially described the widespread acceptance of participative planning, which is an effective way of learning desired conditions. However, Lachapelle et al. (2003) point out that resolving 'wicked problems' and 'messy situations' in urban environments requires a consensus of goals by stakeholders under conditions where problems may not be well defined, values may not be shared, and managers may lack the financial and time resources to involve all stakeholders in the decision making process. Understanding how landscapes, in this case urban green spaces, are perceived and against which criteria they are assessed, may contribute to finding some means of measurement of stakeholder opinion under the common, 'less than ideal', conditions.

Most studies into landscape perception (for example Kaplan & Kaplan 1989; Peron et al. 2002; Purcell et al. 2001) have presented respondents with a selection of visual depictions of environments, asked questions about preference and then looked at common characteristics within the preferred environments. However, there has been little attention given to differences between the constructs that the respondents themselves have used, and had possibly not yet articulated, and the constructs used by the classifying researcher. There is also uncertainty whether findings of preference for natural landscapes would be applicable to urban landscapes. Bourassa (1990) postulates that preferences for natural landscapes may be based on factors quite different from those that serve as the basis for preferences for urban landscapes. Given the absence of evidence to contradict Bourassa's (1990) postulation, it appears that no conclusions can be confidently drawn from the literature with regard to perceptions of urban green spaces. Primary research in the field is therefore necessary.

Field Work as Basis of Research

The temptation is to formulate a survey with a list of possible activities and a list of possible attitudes towards the natural environment. It would probably return reliable results but there is a risk that some of the ways of seeing nature may be missed. However, Thompson (1998)

asserts the need for a move away from consensus-based measures of landscape preference and towards information-gathering methods. Qualitative study might provide a richer source of data, and reveal constructs that the researcher had simply not thought of. Silverman (2004) argues that the status that is to be attached to the collected data must be considered when selecting an appropriate method of data collection. Interview respondents can be considered to be sources of data or alternatively, as providers of actively constructed narratives. In other words, do we take a positivist or a constructivist perspective? Holstein and Gubrium (2004) argue convincingly that all interviews are active and that knowledge is constructed in association with interviewers. In the context of this study, the construction of the narrative is precisely what we are interested in so the choice of the constructivist perspective is clear.

Cognitive mapping, developed by Axelrod (1976) and applied to landscape preference by Steven (2006) looks promising but it seems to concentrate on which physical details are noticed and additionally requires a common language and protocol. Focus groups and Concept mapping (Novak & Canas 2006) look similarly promising, however both data collection techniques also rely on a common language and protocol, while concept mapping also requires drawing ability. Provision of a researcher-created language and protocol would defeat the purpose of the study, which is to learn how the respondents construe the urban landscapes, and there is no evidence to support the assumption of a common language.

Kelly (1955/1991), remaining within the constructivist movement, developed a plausible theoretical foundation, which he called Personal Construct Theory and an associated practical technique to apply the theory, which he called the repertory grid. Kelly (1955/1991) suggests that the way we construe, and make sense and meaning of the world, can be expressed by way of contrasts. He also suggests that a strategy to find what people think is to enter into a discussion with them, thus solving the problem of shared language. Personal Construct Theory appears appropriate for study into the perceptions of landscapes in general and for this study in particular.

Kelly developed the theory within the field of psychology and it has since been applied to a wide variety of fields, but especially in psychiatry and market research (Jankowicz 2004). Although Mathews & Ilbery (1982) and Thompson (1998) have each suggested Personal Construct Theory methods to explore the cognitive constructs which people use in understanding and responding to landscapes, it appears that only Dinsdale & Fenton (2006), in their study of understandings of coral reef condition, have applied the method to examine ascription of meanings to particular physical environments.

Personal Construct Theory

Personal Construct Theory proposes that people have an individual view of the people and events that are part of their life (Kelly 1955/1991). People use their experiences and constant examination of the people and places around them to create a personal explanation, or construct system, of how the world works. Kelly (1955/1991) describes a persons construct system as being composed of a finite number of dichotomous constructs with people predicting what will happen in certain situations based on their past experiences and observations. The constructs are continuously tested as further observations are collected and revised if the predicted outcome does not occur (Fransella & Neimeyer 2004).

One of the central assumptions is that constructs are dichotomous and built up from contrasts rather than absolutes (Jankowicz 2004). An element, in this case an urban green space, will receive meaning by it being seen as both that which it is and contrasted with that which it is not. However, in expressing a meaning, an element is evaluated within a contrast rather than a negative. For example the meaning intended by the descriptor ‘attractive’, can best be understood when opposed to its contrast which may be, say, ‘disinteresting’, ‘ugly’, or ‘repulsive’. Accordingly, learning constructs, with both poles described, allows the researcher to gain a fuller understanding of how a person construes an element than if only a descriptor was found (Fransella & Neimeyer 2004). Kelly’s (1955/1991) repertory grid was specifically designed to elicit dichotomous constructs within the framework of Personal Construct Theory.

The repertory grid technique involves identification of elements that are both the objects of study and the stimulus. Although other elicitation techniques exist, the triadic method is commonly used and will be described here. Respondents are presented with a group of three elements and asked to nominate which two elements are somehow similar to each other and different from the third. The justification for differentiation of the elements is noted as a pole of a construct. The respondent is then asked to identify the contrast to the elicited pole, thus completing the construct. Each of the elements is then rated on a likert scale with each pole representing the extremes of the scale. The process is repeated using various combinations of elements until no new constructs are forthcoming.

Disadvantages of the grid technique include that it is reasonably demanding on the respondent and that it requires a suitably quiet place for the interviews to be carried out. Bradshaw et al. (1993) point out that only a fraction of the ideas latent in personal construct theory have been tapped and that repertory grid techniques can be extended in various ways and integrated with tools springing from complementary perspectives. However, the exploratory nature of this study, combined with sensitivity to the demands placed upon respondents, suggests that the repertory grid, as a stand-alone tool, is appropriate.

Sample

The interviewees (n=17) were selected according to the "theoretical sampling strategy" (Strauss and Corbin 1990; Patton 1990). Winter (2005) highlights the importance that the sample should include individuals who may hold values in different strengths. Statistical representativeness is not intended to be the principle of this strategy but rather one of "maximum variety" (Patton 1990). Thus, a theoretical sample, also called a "purposeful" sample (Patton 1990), consists of people with widely differing opinions, which represent the margin of the sampling universe (fig. 1). The sampling universe in this study consisted of the residents of Zurich.

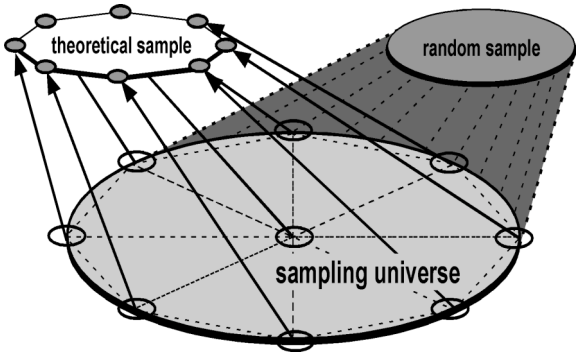

Fig.1: Sampling strategy used in this research
(Source: Hunziker 1995)

The ‘seed’ interview partners were selected according to membership of particular groups that could be reasonably suspected to be a source of differing opinions. A stay at home parent of small children, a dog owner, a member of a nature protection organization, and an inner city office worker were chosen as the initial interview partners. At the conclusion of each of the interviews, the respondent was asked if he or she knew of anybody who would hold a clearly different opinion. The ‘snowball’ procedure was repeated until no new constructs were forthcoming from new interview partners. Nine women and eight men were interviewed with ages ranging from 22 to 75 years. As would be expected from the sampling method, the sample contained members from a broad section of the community. For example, three of the respondents were students, two were stay at home parents, two were retired, one was unemployed, and the remainder were in the workforce. Two of the respondents owned private gardens, six had access to communal gardens, eight respondents had balconies, and five lived in apartments with their only access to green as public green spaces.

Grid construction

Constructs were elicited using the triadic method using researcher-supplied elements so that the focus would remain on a common set of variables. Nine photographs of urban green spaces were selected in consultation with an urban ecologist as being representative of the

various green spaces within Zurich, and were used as stimulus materials. Respondents were asked to imagine their ideal urban green space, and this imaginary ideal landscape was used as a tenth stimulus. Use of the Repgrid IV software package allowed immediate on-site processing of results, which could be immediately checked for validity with the respondents. All of the interactions between interviewer and respondent were recorded.

Individual results give insight into the constructs used by individuals when considering urban green spaces. However, the purpose of the study is to learn the range of constructs used in the population. Compilation of the results from the individual grids revealed 83 constructs and some distillation is needed to present the results in a way that is interpretable. The selected technique was the content analysis procedure described by Jankowicz (2004).

Analysis between grids

Holsti (1968) pointed out that content analysis requires the identification of the unit of analysis, for example text, paragraph, or key word. In this case, the constructs are the base unit of analysis and provide both the content unit and the context unit. Jankowicz's (2004) core-categorisation procedure was used to classify constructs however, particularly when considering nuances of language, there is a question of reliability. Hill (1995) identified three types of reliability in terms of content analysis.

Stability:	That the same classifier would produce the same categories and allocate the same constructs to categories if the procedure were repeated.
Reproducibility:	A second classifier would understand and reproduce both categories and classification
Accuracy:	That constructs are allocated to categories according to consistent criteria.

Jankowicz's (2004) method addresses each of these concerns in its design, based on peer reproduction and comparison. The constructs were categorised, while a colleague simultaneously and independently created a classification. The results of these categorisations were cross-tabulated and revealed clear agreement on four categories and partial agreement on two more. Fifty-three from 83 constructs (64%) were independently classified alike according to the similar categorisation schemes.

The categories were then negotiated until there was agreement on the eight categories presented as the results of this paper. The next step was to each reclassify the elicited constructs according to the new classifications. Eighty of the 83 constructs were identically classified indicating an agreement of 96.5%. However this result does not take random chance of agreement into account. Cohen's Kappa was calculated and returned a

respectable result of 0.95. It was expected that the difference between Cohen's Kappa and percentage agreement would be small because of the number of cells (81) in the grid.

Results and Discussion

The implication of the sampling strategy aiming for maximum variety is that, while no conclusions into proportions existing within the community can be drawn, it can be reasonably assumed that the full range of constructs has been found. Generalisations can be made on the basis of what was common to all responses and also by what was absent from all responses.

The constructs were classified according to the following categories

Category	Definition	Number Constructs
Use /Usefulness	From the individual's perspective. The place is useful / The place is not useful	11
Access	The space is accessible / the space is inaccessible	9
Stimulation	The space inspires or stimulates / The space is uninspiring	13
Plant Growth	Vigorous plant growth / Restricted plant growth	4
Planned nature	Landscape is formed to appear natural / Landscape is otherwise formed	13
Attracts	From a human perspective, landscape attracts the individual / Landscape is uninviting	10
Restrictions	Social or resource restrictions on activities / activities afforded by resources	9
Management	Intensive human intervention / lack of human intervention	13
Miscellaneous	poles not related	1

Common to all constructs is an anthropocentric perspective and no evidence was found in Zurich to support Miller's (2006) assumption that ecological quality is included in residents' perceptions of green spaces. The ecological quality of nature was not mentioned as a construct, despite conscious efforts in sampling to find a respondent who would include it, and no differentiation was made between exotic and native species. Although four constructs were categorised as relating to 'plant growth', a review of the transcripts revealed that all four were referring to the extent that the vegetation had been allowed to grow. These constructs could possibly have been categorised under 'management' but were allocated to a separate category because of their explicit mention of vegetation. The universal anthropocentric perspective allows the interpretation that residents see Zurich essentially as a place for people and that the health of urban ecosystems is of little relevance to them. This finding suggests that Wilson's (1993) biophilia is manifest at, at most, an abstract level in Zurich residents and that a management objective of achieving a healthy ecosystem will not automatically align with the wishes of residents.

A further commonality was that the anthropocentric perspective is, more specifically, egocentric. Absent from all constructs were indications of consideration of the needs of others which Dietz et al. (2005) suggest as a social imperative. While there was evidence that respondents were able to subsume the construing of close family members, such as their own children, there was little evidence of effort to see the world through the eyes of other people. Twenty-Nine of the identified constructs related to the usefulness of a green space to the individual, whether the space was accessible to the individual, and whether there were restrictions in engaging in chosen activities. While these constructs were not universal, and therefore no generalisations can be made, this finding appears to support Schweingruber's (2006) assertion that the usefulness, to the individual, is included in the perceptions of urban green spaces.

Conclusion

This study revealed a dominant anthropocentric attitude, in the case of Zurich, towards urban green spaces. This allows the conclusion that the city is considered a place where the needs of people, and especially the individual, are seen to be the primary consideration. It can be concluded that planners operating within the city would be well advised to tread carefully, given the intensity of use and the finding that opinions are commonly held, if nature is to be encouraged for its own sake. A derivative of the anthropocentric and egocentric perspectives, and a further commonality between respondents, was that all had an opinion of, and were able to articulate a relationship with, urban green landscapes. While it was evident with categories of 'stimulation' and 'attractiveness', that some degree of aesthetic appreciation remains, the principle considerations appear to be how the respondent would interact with the space.

These opinions can be seen as evidence of the functional place attachment described by Schumaker & Taylor (1983). People with an attachment to a particular place are likely to have a greater engagement if the place is perceived to be under threat. This finding, in light of Priskin's (2003) assertion that public acceptance of interventions is affected by people's perceptions of the environment, underlines the importance of understanding the wishes of stakeholders when designing management strategies or interventions. Matthies & Kroemker's (2000) tailored interventions should therefore adopt a similar perspective and tune urban green spaces towards optimisation for human use and aesthetics.

That these findings were revealed supports the choice of a research method that did not supply constructs to respondents. Importantly, this method allowed participants to provide their own meanings rather than being constrained by terms provided by a researcher. There is no reason to suspect that respondents would not answer questions, about for example, the ecological value of urban landscapes had they been asked, which may have suggested the

relevance of constructs that do not actually exist. Kelly's (1955/1991) repertory grid method appears to be useful in identifying the underlying meanings people ascribed to the natural urban environment, which, in turn, provides decision makers with a tool for identifying the collective goals of stakeholders.

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CHAPTER 3

Cultural and Biological Determinants in the Evaluation of Urban Green Spaces

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Abstract:

Dramatically increasing urbanisation is observable worldwide and brings pressure on space within urban areas as the built environment intensifies. Considerable evidence suggests that contact with nature is important for city dwellers, although it is not known whether residents" appreciation of the forms of urban green spaces is constant across different contexts. More specifically, it has not yet been shown whether our appreciation of nature is innate and inherently human, is cultural and something that we learn, or is a mixture of both. This paper describes an exploratory study, consisting of 17 interviews carried out in Zurich, Switzerland. Kelly's repertory grid technique was used to identify preferred urban landscapes, which were contrasted with identified rejected landscapes. Principle components analysis and multi-dimensional scaling revealed a clear separation of cultural and biological modes of landscape assessment in some respondents. The research contributes to an understanding of the meanings of urban green spaces, which would in turn provide planners with a tool to match urban natural resource management with the needs of residents.

INTRODUCTION

A Problem of Green Space Management

We live in a rapidly urbanising world. It is estimated that 47% of the world's population lived in urbanised areas in 2005 and this amount is expected to rise to 60% by the year 2030 (United Nations, 2005). In Switzerland, 75% of today's population live in conurbations with an expected increase to 83% in the year 2030 (United Nations, 2005). As the built environment intensifies, with the understandable aim of preventing the spread of the urban into the surrounding areas, the growing populations require housing and services. This in turn brings pressure on decision makers to release green spaces within urban areas for development. For the purposes of this paper, the term "green space" describes spaces that feature predominantly unsealed, permeable, "soft" surfaces such as soil and grass (Swanwick et al., 2003). The higher density urban living that results from the loss of green spaces to development has potentially significant implications for citizens because of the importance of urban green spaces as nodes of contact with nature (Barthel et al., 2005). Coley et al. (1997) found that natural elements, such as trees, in semi public spaces surrounding urban housing promote increased use by, and interaction between, residents. Urban green spaces that are well used have been shown to encourage bonding between neighbours (Kuo et al. 1998), provide a greater sense of safety (Kuo et al., 1998), and to reduce urban ills such as crime and violence (Kuo and Sullivan, 2001).

The anthropocentric arguments of those seeking to preserve or otherwise enhance green spaces are based on the benefits, described by Costanza et al. (1997) as ecosystem services, that residents receive from the ecosystem, such as the restorative contrast to the built environment that urban nature provides. However, Kaltenborn and Bjerke (2002, p.3) comment that "expanding the perspective from considerations of the functional capabilities of the landscape to values and socio-cultural meanings is probably one of the paramount challenges of future land use planning". Bolund and Hunhammer (1999) concluded that locally generated ecosystem services have a substantial impact on people's quality-of-life and should be addressed in land-use planning. It follows that if city dwellers receive services from green spaces, then enhancement of urban green spaces would be a worthy goal for decision makers in cities. However knowledge of what measures will in fact enhance a particular space must guide intervention strategies (Matthies and Kroemker, 2000). Gobster et al. (2007) point out that acceptance of interventions is dependent on landscapes meeting expectations of being aesthetically attractive, while Nasar (2002, p.1822) puts it plainly that "community appearance matters to people".

Aims

Public acceptance of replication of successful interventions from other contexts requires knowledge of the way in which people perceive the environment (Priskin, 2003). Bourassa (1990) articulated a paradigm for environmental assessment and proposed that individual differences in landscape preference can have both cultural and biological determinants, moderated by the individual. We would therefore be informed, when seeking suitable interventions in urban green spaces, by knowledge of whether people have a biological, and therefore an appreciation of the aesthetics of such spaces that is independent of context, or whether appreciation is culturally determined. This exploratory study addresses that challenge and, using in depth interviews conducted in Zurich, Switzerland, aims to identify the determinants that cause landscapes to be either favoured or rejected. In short, we seek to answer the research question of whether the determinants that cause a landscape to be either selected or rejected are cultural, and refer implicitly to behaviour that is learned (Bourassa, 1990), or biological, and refer to behaviour that is innate (Bourassa, 1990).

Cultural and Biological Determinants of Landscape Preference

Those who consider appreciation of nature to be culturally driven argue that the significant factors are those that imply a social, spiritual or self-actualisation dimension, or those that clearly relate themselves to the activities of mankind (Bourassa, 1990). Cosgrove (1998) has apparently little doubt that the idea of landscape, which is how Europeans have represented their world as a source of aesthetic enjoyment, is a cultural concept. Godfrey-Smith (1979, p.310) described a service that nature provides, from an anthropocentric perspective, as that of a cathedral. The cathedral role appears to be clearly cultural and Godfrey-Smith argues that “wilderness areas provide a vital opportunity for spiritual renewal, moral regeneration, and aesthetic delight”. Danto (2003) points out that aesthetic judgments within a culture may be conditioned over time. For example in early 18th century England gardens were considered beautiful when they were ordered into symmetrical patterns and mathematical figures. By the end of that century the comparatively wild “expressive” gardens had become the definition of beauty (Egbert, 2000). Given that the aesthetic appreciation collectively changes over time, it would seem reasonable to assume that the clearly cultural concept of fashion has a role to play in its formation.

A biological determinant of landscape assessment is supported by Farina and Belgrano’s (2006) premise that cognition is an essential component of the living strategies of organisms and that cognition is a step in assigning meaning to a particular space. Among the dominant biologically based theories in understanding landscape assessment are Kaplan and Kaplan’s (1989) information processing theory and Appleton’s (1975) prospect refuge theory. Information processing theory suggests that preferred landscapes are similar to those which stimulated and facilitated primitive man’s gathering of information and thus promoted the

development and differentiation of his most distinguishing feature; his power of reasoning (Bourassa, 1991). Landscape perception is expressed in terms of complexity and mystery, which relate to the need to gather information, and coherence and legibility, which relate to the need to make sense of the information (Kaplan and Kaplan, 1989). Most studies into landscape aesthetics (for example Kaplan and Kaplan, 1989; Peron et al., 1998; Purcell et al., 2002) have presented respondents with a selection of visual depictions of environments, asked questions about preference, and then looked at common characteristics within the chosen environments (Hagerhall, 2000). Several studies have analysed the influence of one or all of these four paired characteristics identified by Kaplan and Kaplan (1989) on those preferences capable of being empirically determined (Coeterier 1996; Herzog 1989; Strumse 1994; van den Berg et al. 1998). The relevant findings ranged from ambivalent (Strumse 1994) to completely negative (Coeterier 1996). Bourassa (1990) suggests that the problem lies in the absence of an encompassing theory and attempts to resolve the biological / cultural debate by combining biological, cultural, and personal bases for aesthetics in a comprehensive paradigm.

Appleton's (1975) prospect-refuge theory provides the basis for his claim that human attraction to particular landscapes is a biological condition. According to Appleton (1975), a landscape with a wide, open view that allows observation of approaching predators, and simultaneously provides protected settings that prevent the viewer from being seen, gives evolutionary advantages. Livingston (1981, p.117) goes as far as saying that appreciation of the beauty of nature is purely biological and concluded that appreciation of nature is found in the "sub-rational sense, lodged within the very core of being of unalienated humans, of a deep complicity in the beauty, that is life, possesses". Empirical evidence in support of Appleton's (1975) theory has been reported by Clamp and Powell (1982), Woodcock (1982), Abello and Bernaldez (1986), Mealy and Theis (1995) and Hagerhall (2000), although Klopp and Mealey (1998) concluded that their results did not offer support for the theory. Variation in prospect/refuge affordances do not necessarily contradict the theory as differences may be due to what appears to be prospect or refuge rather than the theory itself being not a biological explanation (Hunziker et al., 2007). The savannah theory of Orians (1980, 1986) puts substantial weight on the fact that the first humans lived in the African savannah. Chamberlain (2000) however, points out that the savannah dwelling scenario of human evolution is over-simplified, and the current state of knowledge among palaeoanthropologists is that earlier human species were not optimally adapted to any particular and singular environment.

There appears to be little argument that both Appleton's (1975) attraction criteria and Kaplan and Kaplan's (1989) factors of coherence and complexity, and mystery and legibility are biological drivers, however, both theories focus on only some of the many biological factors

and give considerably less attention to cultural and experiential influences. Appleton (1975) explains non-biological manifestations of landscape preference as being no more than variations in ways of responding to biological needs and thereby reduces culture to the biological. Similarly, Wilson (1975) suggests that any attempt to explain behavioural patterns, which have a degree of genetic cause, should speak of a biological base for behaviour, even if innate behaviours were always moderated by culture.

The alternative interpretation is that if culture mediates all biological needs, then the consideration of a biological determinant of aesthetic experience becomes irrelevant (Bunkse, 1977, Jeans 1977). Others acknowledge the influence of both biology and culture, such as Dewey (1934) who stated that "aesthetics involves cultural and personal influences and is not simply a matter of biological drives". According to Midgely (1978, p.286) "culture is not an alternative or replacement for instinct, but its outgrowth and supplement." Midgely thereby recognises that humans retain biological needs as they develop cultures and that culture provides an additional or supplementary influence on humans. Price (2004) proposes that people perceive landscapes with emphasis on principles he describes as either naturalness or artistic, with the dominant principle dependent on the landscape context, the individual's cultural or socio economic background, and individual characteristics such as profession.

Preferences for Particular Landscapes

Research into people's landscape preferences has identified a remarkable consistency in human preference for natural landscapes, (Hartig and Staats, 2005) and have been found to be those that

- are natural, as opposed to urban (Ulrich,1983; Kaplan and Kaplan, 1989; Lamb and Purcell 1990; Hartig and Staats, 2005);
- contain a variety of landscape elements and a variety of plant species (Misgav, 2000);
- display a degree of management (Ulrich, 1986; Gobster, 1995); and
- are open (although not exposed) while containing a high degree of depth and a moderate-to-high degree of complexity (Ulrich, 1983; Kaplan and Kaplan, 1989; Hunziker 1995; Hunziker and Kienast 1999).

However, the empirical study of landscape aesthetics has mostly been carried out in the absence of an encompassing and unifying theory that would help to explain which factors serve as the basis for preferences (Bourassa, 1990) and the work that has been done in theory has tended to be dominated by either a biological or cultural basis of aesthetic behaviour.

Modes of Aesthetic Experience

Research into landscape aesthetics has understandable concentrated on the interactions between the physical and psychological aspects of landscape perception. Zube, Sell and Taylor (1982) reviewed over 160 articles published before 1980, with reference to four paradigms that had been followed in assessing perceived landscape values (namely expert, psychophysical, cognitive, and experiential), and noted the absence of an explicit theoretical foundation. Daniel and Vining (1983) reviewed the body of landscape-quality assessment methods and concluded that neither the ecological nor the formal aesthetic models can serve as a basis for an adequate landscape assessment system, and suggest a careful merger of the psychophysical and psychological approaches to provide the basis of a useful system. Gobster and Chenoweth (1989) examined the empirical relationships between various paradigms for describing and evaluating landscape preferences and found that physical, psychological, and artistic dimensions can explain aesthetic preference. They concluded that artistic and psychological dimensions "defined separate constructs relating to compositional and affective-informational meanings", which was not the case with physical descriptor dimensions (p.68). Daniel (2001) advocates a psychophysical approach in the formulation of a landscape quality assessment system to provide a balance between biophysical and human judgement components.

Parsons and Daniel (2002) concentrated on the human dimension of how and why landscapes are preferred, and suggest examination of the emotional attachments elicited by the experience of preferred landscapes to contribute to an understanding of visual and non-visual environmental aesthetics. Bourassa (1990) proposed a tripartite paradigm in which "both biological and cultural factors underlie the personal mode, and that the individual can transcend those constraints through intellectual activity". In this case, "mode" means the particular way of seeing, which is the manifestation of the underlying determinants of the way of thinking (Cosgrove, 1998). The theoretical basis of Bourassa's paradigm follows the Russian psychologist Vygotsky's (1978) developmental approach to understanding the human mind and behaviour. Vygotsky argued that, in order to comprehend human behaviour, it is necessary to understand the processes by which individuals develop. Vygotsky's emphasis on a developmental approach to understanding human behaviour resulted in a tripartite scheme combining phylogenesis (or biological evolution), sociogenesis (or cultural history), and ontogenesis (or individual development). Individual development serves to explain variation within cultures, as has been observed by Brady (2007, p.142) who notes that "mudflats and wastelands may also have aesthetic value, and perceiving that is dependent upon the effort of the percipient". Such a tripartite organization appears compatible with Dewey's (1934) theory of aesthetics but Dewey does not explain how biological and cultural factors interrelate in aesthetic experience of landscape. Remaining

within the tripartite paradigm explains the lack of empirical confirmation of biology-based theory in that ignoring cultural and individual aesthetics can only give part of the picture.

Bourassa (1990) points out that humans may share some innate preferences for certain types of natural landscapes, evidenced by the consistency of preference noted by Kaplan and Kaplan (1982) and Hartig and Staats (2005). However, little evidence has been offered that landscapes used in preference studies have meaning or significance for groups represented in those studies. Studies seeking to discover deep-seated human instincts, rarely consider the relationship between nature and the individual and care is usually taken to ensure that respondents do not recognise particular scenes used in the studies. Van den Berg and Vlek (1998, p.8) departed from this trend by asking respondents to assess landscapes from differing personal perspectives and concluded that "at least part of the beauty perceived in natural landscapes is derived from the knowledge that people bring into their aesthetic judgements". One can infer from this finding that people, when assessing a landscape, will have a preconceived idea of how it should be, or in other words, they have a set of criteria against which they judge the quality of the landscape.

Modes of Assessment of Urban Landscapes

It has not yet been determined whether findings of preference for natural landscapes would be applicable to urban landscapes and whether preferences are transferable between different urban contexts. Studies have consistently shown that natural environments are preferred over urban environments (Peron et al., 2002) although most have contrasted stark urban environments with natural scenes (for example Hartig and Staats, 2005; Hartig et al., 2003; Staats et al., 2003; Ulrich et al., 1991; van den Berg et al., 2003). Considering the different modes of aesthetic experience helps to explain such preferences and suggests caution in inferring preferences for urban landscapes. It can be argued, that they are comparing two different things, namely a biological aesthetic and a cultural aesthetic, meaning that preferences for natural landscapes are probably based on factors quite different from those that serve as the basis for preferences for urban landscapes. Bourassa (1990, p.806) wrote that "it seems likely that natural landscapes are experienced largely in the biological mode, whereas urban landscapes are experienced primarily in the cultural mode". Price (2004) reached a similar conclusion although he described wildernesses to be perceived under the dominance of "naturalness" principles, while cultural landscapes are perceived under the dominance of "artistic" principles.

Hernandez and Hidalgo (2005), in one of the few studies examining the restorative effects of nature within cities, found that respondents viewing urban scenes with natural elements returned higher scores on a measure of restorativeness than those viewing the same scenes without the natural elements. Peron et al. (2002) found that mixed environments containing

both built and natural elements are often perceived as being as restorative as purely natural environments. Sullivan et al. (2004) found that the presence of natural elements correlates with the use of outdoor spaces and the social activity that takes place within them, which allows the extrapolation that they are preferred. Ogunseitan (2005) in his study of topophilia in an urban environment, identified factors that contribute to attachment to place, which he labelled “cognitive challenge”, and “familiarity”, “ecodiversity” and “synesthetic tendency”. It could be argued that this supports the tripartite paradigm with the first two factors corresponding closely to Kaplan and Kaplan’s mystery and legibility categories while ecodiversity refers to a learned attraction to natural elements such as flowers and animals. Synesthetic tendency describes preferences for particular colours and sounds, and which suggests an individual difference. However, it appears that there is insufficient data to infer the mode of aesthetic experience when an individual evaluates an urban landscape.

While it is possible to measure social activity and perceived restorativeness associated with a particular landscape, it is more difficult to measure which, if any, mode of assessment is used. Balling and Falk (1982) found that savannah landscapes were consistently preferred over forest and desert landscapes, although this preference diminished with age. They concluded that this result showed an inbuilt biological-instinctive reaction in younger people who had experienced a lower grade of socialization. The measurement difficulty is underlined by Lyons’ (1983) suggestion that this result may have shown that savannah landscapes are similar to park landscapes where children usually play, and that the preference is a product of cultural norms.

Research Gap

Foster (1998, p.127) points out that “if we want to argue for the importance of aesthetic values in relation to the natural environment, and wish to persuade others of those values, we must first have confidence that the premises for our argument grow out of, and are firmly rooted in what we can reasonably be said to know”. However, it is evident that no reasonable conclusions can be drawn from the results of previous study as to what modes of aesthetic experience people use when expressing preferences for urban green spaces. Furthermore, both Bourassa (1990) and Farina and Belgrano (2006, p.6) have called for more research progressing towards the development of a “science of landscape” in order to understand how we perceive and appreciate landscapes. Van den Berg et al. (1998) comment that, in order to be of theoretical and practical relevance, empirical research in landscape assessment should provide information on the determinants of individual differences in terms of preferred landscape characteristics. Primary research was therefore undertaken in an attempt to address the aims of this study by identifying and classifying the determinants that cause landscapes to be either favoured or rejected. Such knowledge of the way in which people perceive their environment is needed to answer whether urban nature is appreciated the same by all people or whether it is something that we learn, which will in turn influence

whether successful interventions from elsewhere should be applied in different cultural contexts.

METHOD

Methodological/Theoretical Framework

The predominant method of measurement of attitudes towards urban green spaces has been through the use of structured questionnaire surveys (Balram, 2005). However, there is no underlying theory, and consequently no comprehensive list of available constructs that are likely to be used when an individual considers urban green spaces. Use of surveys therefore brings a risk that some of the ways of seeing nature may be missed or that irrelevant alternative ways may be introduced. In addition, Thompson (1998) asserts the need for a move away from measures of landscape preference that test agreement with preconceived constructs and towards information-gathering methods. Cosgrove (1998, p. 13) described landscape as "the external world mediated through subjective human experience" so that it is "not merely the world we see, it is a construction, a composition of the world." Personal Construct Theory was therefore selected to provide the theoretical framework in learning which constructs the respondents themselves use, and have possibly not yet articulated, and which avoids introducing constructs that stem from the researcher (Home et al. 2007).

Personal construct theory is concerned with how people make sense of the world (Kelly 1955/1991). Kelly developed the theory in the field of psychology and it has since been applied to a wide variety of fields ranging from market research (Jankowicz, 2004) to ascription of meanings to environments (Dinsdale and Fenton, 2006). The theory states that people have an individual view of the people and events that are part of their life (Kelly 1955/1991). The term "construct" reflects the dual role of the concept. People use their experiences and constant examination of the people and places around them to construct a personal explanation of how the world works. Meanwhile, constructs are an individual's predisposition to perceive, and refers to how the world is construed. The individual continuously revises their constructs as further observations are collected. People predict what will happen in certain situations based on their past experiences and observations and, if the predicted outcome does not occur, the construct is revised (Fransella and Neimeyer, 2004).

Kelly (1955/1991) describes a person's construct system as being composed of a finite number of dichotomous constructs. One of the central assumptions is that what an individual understands of reality is built up from contrasts rather than absolutes (Jankowicz, 2004; Fransella and Neimeyer, 2004). An element, in this case an urban green space, will receive meaning by it being seen as both that which it is and contrasted with that which it is not. So,

in expressing a meaning, it is evaluated within a contrast rather than a negative. For example, the meaning intended by the descriptor “attractive”, can best be understood when opposed to its contrast which may be say, “disinteresting”, “ugly”, or “repulsive”, while its negative would be the less informative descriptor “not attractive”. Accordingly, eliciting constructs allows the researcher to understand how a person views and values the environment.

Procedure

Constructs were elicited using the triadic method (Jankowicz, 2004) using researcher-supplied elements so that the focus would remain on a common set of variables. Nine photographs of urban green spaces, selected in consultation with an urban ecologist as being representative of the various green spaces within Zurich, were used as stimulus materials. The photographs, with each landscape’s assigned number, are shown in figure 1 and these numbers will be used as the landscape reference in the following discussion. Respondents were asked to imagine their ideal urban green space and to imagine and remember what their ideal would look like when photographed and presented in a similar way to the stimulus photographs. This imaginary ideal landscape was used as a tenth stimulus. Respondents were presented with a random group of three elements, from the set of 10, and asked to nominate which two elements were somehow similar to each other and different from the third. The justification for differentiation of the elements was noted as a pole of a construct. The respondent was then asked to identify the contrast to the elicited pole, thus completing the construct. Each of the elements was then rated on a Likert scale with each pole representing the extremes of the scale. The process was repeated using further random combinations of elements until no new constructs were forthcoming.

Figure 1

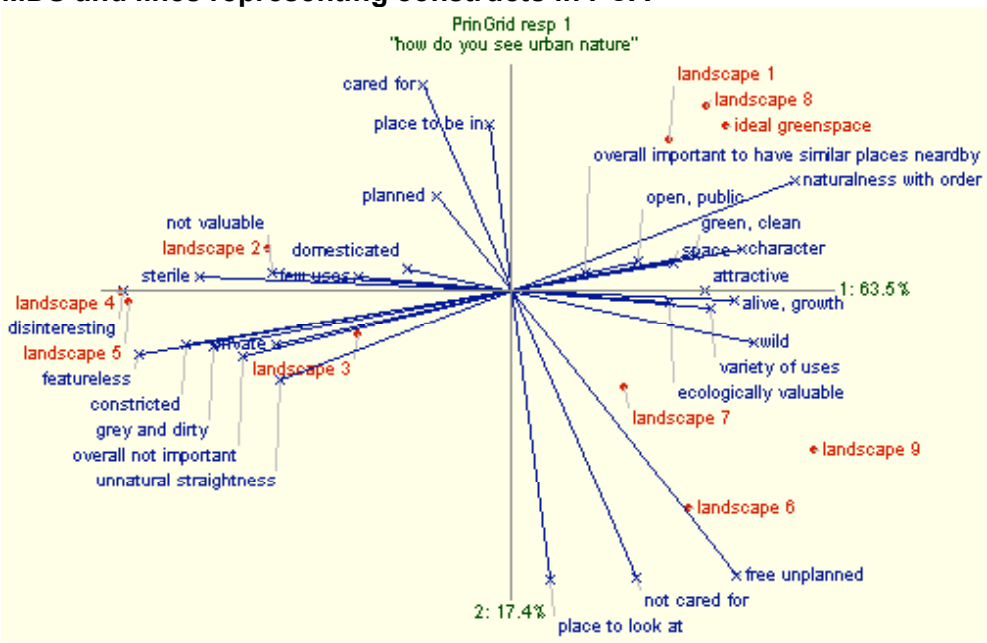
Photographs of urban green spaces used as stimulus materials

		
1) Shared apartment block garden. Lightly managed with organic shapes.	2) Public open space with green confined to geometrically shaped beds.	3) Intensively managed public open space.
		
4) Shared apartment block garden. Intensively managed and with geometric shapes.	5) Intensively managed private garden.	6) Inner city ruderal (abandoned) green space.
		
7) Lightly managed private garden.	8) Lightly managed public open space, designed to appear to be a natural space.	9) City fringe ruderal (abandoned) green space.

The individual grids were analysed using the statistical techniques of multidimensional scaling (MDS) and principal components analysis (Jankowicz, 2004). MDS is used to plot points in multidimensional space so that the physical distances between points on the plot(s) represent the subjective distances perceived by respondents. Points in the plot that are closer together are perceived as being more similar than those that are further apart (Garson, 2008). The Software package Repgrid IV was used to process the collected data and the results of a MDS analysis were superimposed onto the same axes as the two components explaining the most variation of a principal components analysis (PCA). PCA can be used to identify clusters of constructs by revealing the structure (dimensions) of the set of constructs and finding which of them respond similarly to the stimulus materials

(Garson, 2008). Construct pairs for which the component lines intersect at an acute angle are considered to be more similar to each other than construct pairs for which the apex angle is less acute. The relative position of the element point to the component lines allowed inference into the determinants used by the individual to describe each element. The results were then immediately checked for validity with the respondent. All of the interactions between interviewer and respondent were recorded. An example of an interview output is shown in figure 2.

Figure 2
Example of output of repertory grid with points representing stimulus landscapes in MDS and lines representing constructs in PCA



This allowed an interpretation of which constructs were the determinants of preference for the favoured landscape (Jankowicz, 2004). The determinant constructs were then assessed according to whether they conform to factors that Kaplan and Kaplan (1989) and Appleton (1975) would describe as biological, or that Cosgrove (1998) would describe as cultural. For example constructs such as “liveliness”, “intimacy”, and “suitability for family” can be reasonably classified as culturally defined attributes. Meanwhile constructs such as “stimulation”, corresponding with Kaplan and Kaplan’s (1989) “stimulation” factor, and “space” corresponding with Appleton’s (1975) prospect factor can be reasonably classified as biologically defined attributes. The same procedure of classifying the constructs explaining the most variance in a factor analysis was carried out for the rejected landscapes in each dimension. To minimise the subjective nature of such a classification, a peer control was carried out and the classification of constructs was negotiated until agreement was reached. This negotiation procedure was deemed sufficient given the exploratory nature of this study and is described as follows.

Holsti (1968) pointed out that content analysis requires the identification of the unit of analysis, for example text, paragraph, or key word. In this case, the constructs are the base unit of analysis and provide both the content unit and the context unit. Jankowicz's (2004) core-categorisation procedure was used to classify constructs however, particularly when considering nuances of language, there is a question of reliability. Hill (1995) identified three types of reliability in terms of content analysis.

Stability:	That the same classifier would produce the same categories and allocate the same constructs to categories if the procedure were repeated.
Reproducibility:	A second classifier would understand and reproduce both categories and classification
Accuracy:	That constructs are allocated to categories according to consistent criteria.

Jankowicz's (2004) method addresses each of these concerns in its design, based on peer reproduction and comparison. The constructs were categorised, while a colleague from another scientific discipline (an ecologist) simultaneously and independently created a classification. Fifty-three from 83 constructs (64%) were independently classified alike according to the similar categorisation schemes.

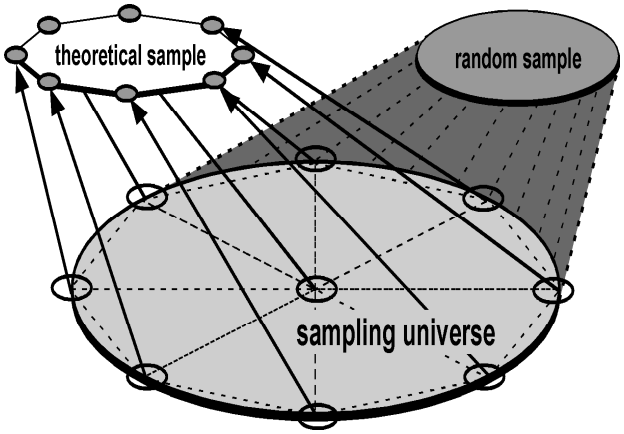
The classification criteria were then discussed on a construct by construct basis until agreement was reached. The next step was to each, and independently, reclassify the elicited constructs according to the agreed classification criteria. Eighty of the 83 constructs were identically classified indicating an agreement of 96.5%. However this result does not take random chance of agreement into account and a Cohen's Kappa of 0.93 was calculated.

Participants

The interviewees (n=17) were selected according to the theoretical sampling strategy (Strauss and Corbin 1990; Patton 1990). Winter (2005) highlights the importance that the sample should include individuals who may hold values in different strengths. Statistical representativeness is not intended to be the principle of this strategy but rather one of "maximum variety" (Patton 1990). Thus, a theoretical sample, also called a "purposeful" sample (Patton 1990), consists of people with widely differing opinions about the topic under study, and who represent the margin of the sampling universe. The strategy is portrayed graphically in Hunziker's (1995) diagram shown in figure 3. The sampling universe in this study consisted of the residents of Zurich. A member of an environmental organization, a parent of a small child, and a person living in an apartment with neither balcony nor garden, were selected as "seed" interview partners due to the supposition that they may have a relationship with local green spaces. At the conclusion of the interviews, they were asked if

they knew of somebody who they believed to be a source of differing opinions. This non-representative 'snowball' technique of identifying interview partners was deemed to be sufficient in this exploratory study

Figure 3
Sampling strategy used in the project. Respondents were selected from opposite margins of the sampling universe. The random sample was not used but is shown here by way of illustration.
(Source: Hunziker, 1995)



Some characteristics of each respondent are listed in Table 1. Respondents will be named in the following results and discussion according to their allocated respondent number.

Table 1 Selected demographics of respondents

Respondent	Dwelling	Garden	Occupation	Dog	Gender	Age
1	Apartment	None	Student (Information technology)	No	Female	32
2	Apartment	Private	Retired	No	Male	67
3	Apartment	None	Student (Natural Sciences)	Yes	Female	29
4	Apartment	Shared	Aviation	No	Male	41
5	Apartment	Shared	Parent (full time)	No	Female	36
6	House	Private	Retired	Yes	Female	71
7	Apartment	Shared	Clerical	No	Male	27
8	Apartment	Balcony	Information technology	No	Male	36
9	Apartment	None	Theatre	No	Female	30
10	Apartment	Balcony	Parent/Clothes designer	No	Female	44
11	Apartment	Shared	Unemployed	No	Male	23
12	Apartment	None	Student (Geography)	No	Female	28
13	Apartment	Balcony	Retail sales	No	Female	35
14	Apartment	None	Retired	No	Female	61
15	Apartment	Shared	Household	Yes	Female	25
16	House	Courtyard	Information technology	No	Female	40
17	House	Private	Banking	No	Male	42

RESULTS

The favoured landscape was considered to be the landscape closest in the multidimensional scaling to the ideal landscape nominated by the respondent. The determinant constructs for the selection of the favoured landscapes were found to be a mixture of culturally and biologically driven determinants in many of the cases. However in some of the respondents, it appears that the determinants were nominated in either the biological or cultural mode. The

responses from six of the respondents are presented as being particularly illustrative. The determinant constructs for the selection of the favoured landscapes, and their categorisation according to criteria of cultural, or biological are shown in Table 2.

Table 2 Constructs used in selecting favoured landscapes

Resp	Determinant constructs	Justification	Mode
3	Wild	"Wild" has the connotation of a place in which game might be found. The German word "Wild" translates to both wild and game.	Biological
	Freedom to move	Consistant with Orians' savannah theory and consequently with Appleton's prospect/refuge theory.	Biological
	Place for different things	Consistent with Kaplan and Kaplan's "Complexity".	Biological
	Things to discover	Consistent with Kaplan and Kaplan's "Mystery".	Biological
17	Healthy nature	"Healthy nature" indirectly indicates the presence of water and is consistent with the evolutionary explanation (see Parsons and Daniel, 2002, p.47).	Biological
	Interesting	Consistent with Kaplan and Kaplan's "Mystery".	Biological
	Complexity	Consistent with Kaplan and Kaplan's "Complexity".	Biological
2	Fine	The word "fine" is translated from the German word "fein" which has connotations of human intervention. While it is synonymous with "subtle" and "precise", it primarily means "agreeable"	Cultural
	Clean	Clean is translated from the German word "sauber" which has the connotation of having been cleaned, or of something that has been done well.	Cultural
	Character	"Character" is translated from the German "Charakter" and, in this context, has implications of the personality or flavour of the landscape.	Cultural
	Established	"Established" has the clear connotation of something that has been installed. It was translated from the German word "Etabliert" which means established or arranged.	Cultural
5	Lively and Noisy	"Lively" was translated from the German word "lebendig" which has implications of vitality. When connected with "noisy", it can be interpreted to refer to a social dimension.	Cultural
	Public	"Public" was translated from the German word "öffentlich", which in this context refers to the right of access.	Cultural
	Family activity	This was interpreted as reference to the social dimension of family activity.	Cultural
8	Recreation	"Recreation" has the implication to be an activity carried out to recover from survival-oriented activities.	Cultural
	Nature	Although "nature" could be argued to be a biological driver, the respondent related nature to recovery and opportunities for recreation.	Biological / Cultural
	Space for activities	While "space" has the implication of openness, and therefore prospect, it's connection with activities suggests a cultural dimension.	Cultural
	Interesting	Consistent with Kaplan and Kaplan's "Mystery".	Biological
13	Inviting	Argument can be made that "inviting", translated from the German "einladend", could be either biological or cultural.	Biological /Cultural
	Different elements	Consistent with Kaplan and Kaplan's "Complexity".	Biological
	Attractive to many people	While "attractive" could be interpreted as being either a biological or cultural driver, the connection with to whom it would be attractive suggests a social dimension.	Cultural

Biologically driven selections:

Respondent 3 favoured landscape number 9 and offered the constructs labelled "Wild", "Freedom to move", "Place for different things", and "Things to discover" as justification. Respondent 17 favoured landscape number 1 and offered the constructs labelled "Healthy nature", "Interesting", and "Complexity" as justification. Respondent 17 found landscape 1 to be *"stimulating, it's simply wild. It's nice to have wild space, that's allowed to be wild".*

Culturally driven selections:

Respondent 2 favoured landscape number 1 and offered the constructs labelled "Fine", "Clean", "Character", and "Established" as justification. Respondent 2 reported *"often go[ing] to the forest for philosophical reasons. Greenness makes me happy; flowers, birds, trees.* Respondent 5 favoured landscape number 8 and offered the constructs labelled "Lively and Noisy", "Public", and "Family activity" as justification. Respondent 5 is the parent of a small child. The role of nature in this respondent's life is central and illustrated by the observation that *"we often go for walks, sometimes with friends, sometimes just the two of us, my daughter's 2 years old now and she really needs fresh air and I do as well".*

Mix of culturally and biologically driven selections:

Respondent 8 favoured landscape number 8 and offered the constructs labelled "Recreation", "Nature", "Space for activities", and "Interesting" as justification. Respondent 8 found landscape 8 to be *"very nice, it is a park where you could recover, it's a bit of a larger space and has a bit more nature in it, and some paths I assume, it looks like, and some place where you could sit, at the back there is some sport possibilities, I like it".* Respondent 13 favoured landscape number 8 and offered the constructs labelled "Inviting", "Different elements", and "Attractive to many people" as justification. Respondent 13 commented that "i*t looks like a lot of people would come here, it is inviting and formed with different elements".*

Similarly, the rejected landscapes were considered to be the landscape furthest in the multidimensional scaling from the ideal landscape nominated by the respondent along the axis explaining most of the variance. The determinant constructs for the selection of the favoured landscapes were found to be a mixture of culturally and biologically driven determinants in many of the cases while in others, the rejections were made in either the biological or cultural mode. The determinant constructs for the rejection of the unfavoured landscapes, and their categorisation according to criteria of cultural or biological, are shown in Table 3.

Table 3 Constructs used in rejecting unfavoured landscapes

Resp	Determinant constructs	Justification	Mode
3	Boring	"Boring" has the implication of lack of mystery, and would not stimulate and facilitate gathering of information.	Biological
	Uninspirational	"Uninspirational" can be seen as consistent with a lack of Kaplan's and Kaplan's "mystery" factor.	Biological
	Private access	The right of access is a clearly cultural construct.	Cultural
17	Lifeless	"lifeless" is a translation of the German word "flau", which also means dull, spiritless, or stagnant. The respondent was referring to its not having been formed to its full potential.	Cultural
	Inaccessible	The respondent was referring to right of access rather than physical accessibility.	Cultural
	Human formed	"Human formed" can be interpreted as a comment on the design. Urban landscapes can be reasonably expected to be human formed but in this case the form inspired rejection.	Cultural
2	Small, Closed	"Small, Closed" carries an implication of the personality of the space rather than it being physically closed. "Closed" is translated from "geschlossen" in German and is not synonymous with "beschränkt" meaning restricted.	Cultural
	New installed	"New installed" refers to the human dimension and is the antonym of established	Cultural
	Characterless	Characterless is the condition of an absence of personality.	Cultural
5	Private	In this case, "private" refers to right of access.	Cultural
	Lonely and quiet	"Lonely and quiet" is the contrast of "lively and noisy" in this case.	Cultural
	Not for families	This was interpreted as reference to the social dimension of family activity.	Cultural
	Unstimulating	"Unstimulating" can be seen as consistent with a lack of Kaplan's and Kaplan's "mystery" factor.	Biological
	Restrictive	"Restrictive" is translated from the German word "beschränkend" which can be interpreted as the contrast to the open areas providing prospect.	Biological
8	Design	Rejection on the basis of an unpleasing design, or that it has been manifestly designed, can reasonably be interpreted as a cultural construct	Cultural
	Usefulness	Usefulness has a clear implication of a cultural dimension	Cultural
13	Restrictions	See "restrictive"	Biological
	Unstimulating	"Unstimulating" can be seen as consistent with a lack of Kaplan's and Kaplan's "mystery" factor.	Biological

The rejection responses from the six respondents selected as being particularly illustrative are presented here.

Culturally driven rejections:

Respondent 2 rejected environment number 4 and offered the constructs labelled "Small", "Closed", "New installed", and "Characterless" as justification. Respondent 17 rejected landscape number 5 and offered the constructs labelled "Lifeless", "Inaccessible", and "Human formed" as justification. Respondent 17 found this landscape to be "*uninviting, and under-utilised, some thinking could add a lot to it, some plants and some bushes. It's a shame because it has potential".* Respondent 8 rejected landscape number 1 and offered the constructs labelled "Design" and "Usefulness" as justification. Respondent 8 commented, *"I find it a bit loveless, the*

whole, it is a bit natural but not really natural, it is a mix between artificially installed and natural but I find it an unhappy mix, it is neither natural nor artificial. Just a bit loveless for me".

Biologically driven rejections:

Respondent 13 rejected landscape number 4 and offered the constructs labelled "Restrictions" and "Unstimulating" as justification. Respondent 13 commented that "*it looks to have been recently installed, but it is still quite boring".*

Mix of culturally and biologically driven rejections:

Respondent 3 rejected landscape number 4 and offered the constructs labelled "Boring", "Uninspirational, and "Private access" as justification. Respondent 5 rejected landscape number 5 and offered the constructs labelled "Private", Lonely and quiet", "Not for families", "Unstimulating", and "Restrictive" as justification.

DISCUSSION

Since the stimulus landscapes used in this study are green spaces within a city, and the respondents are urban residents, it could be expected that the boundaries of cultural and biological determinism would be blurred. The expected mix of biological and cultural determinants proved to be the case for some of the respondents but for the remainder, either a biological or cultural dominance was able to be determined in the constructs that characterised their preferred landscape. Although constructs were repeated among respondents, and grouped into components in the principal components analysis, there was no evident consistency in the grouping of components between respondents. For example, nature loaded with unstructured and growth for one respondent while nature loaded with recreation, interest and size for another. This finding adds support to Bourassa's (1990) paradigm that the individual moderates cultural and biological determinants.

However in the constructionist perspective, we remember that constructs are also defined by their contrasts. If we look to the rejected landscapes, and look at why they were rejected, then we may expect to see some differentiation across principal components. Interpreting these components could provide evidence whether influences are cultural or biological. The rejected landscapes were considered to be those furthest from the ideal landscape along the axis explaining most of the variance. The most strongly rejected landscapes tended to be the least natural, and those with the least structural and vegetational complexity, or those with the most exposure. Landscape 4 was consistently rejected and, although structurally complex with varied vegetation, was differentiated by a deliberate use of straight lines and hard angles. This lack of preference is consistent with the previously established preference for natural landscapes, in which straight lines and hard angles would not normally be

expected, as opposed to urban landscapes (Ulrich, 1983; Kaplan and Kaplan, 1989; Lamb and Purcell, 1990). However, all of the stimulus landscapes were located within an urban environment in which it might have been expected that assessment would have been made in a cultural mode and straight lines would not be objectionable. It appears therefore that assessment of green spaces within urban environments maintains at least some biological element.

In some cases, a landscape was selected in one mode while another mode was used to reject an unfavoured landscape. Respondent 3 selected an open ruderal landscape (landscape 9) as being closest to the ideal and constructs that could be classified, using Kaplan and Kaplan's (1989) criteria, as biological drivers were offered as justification for the preference. The landscape furthest from this respondent's ideal was the intensively managed landscape with geometrical forms (landscape 4). Constructs offered as reasons for the rejection were also biological, however the clearly cultural construct of ownership was offered as an additional reason. This respondent selected a favoured landscape according to biological criteria, and rejected an unfavoured landscape according to a mixture of biological and cultural criteria.

Another apparent contradiction is that the lightly managed landscape that had been installed to appear natural and wild (Landscape 1) was selected by two respondents (respondents 2 and 17) as being closest to their ideal, and was rejected by Respondent 8 as being furthest from his ideal. The justification constructs offered by Respondent 17 for selection were biological, in that the wildness was found to agree with Kaplan and Kaplan's (1989) factor of stimulation, while the justification constructs offered by Respondent 2, who nominated philosophical reasons as the basis of his relationship with nature, were cultural, in that the character and established structure of the landscape were appealing. Respondent 8 also used cultural constructs but rejected this landscape based on a criticism of the design. This result underlines the challenge faced by researchers attempting to deduce the determinants of preference, based on the attributes of the environment in question.

Respondent 2 also based his rejection of the unfavoured landscape (landscape 2) on grounds that could be classified, according to Cosgrove (1998) as being cultural, in that it was "newly installed" and "characterless", and was thereby consistent in using cultural grounds for both selection and rejection. Respondent 17 however, after basing the selection of a preferred landscape on biological determinants, then rejected his unfavoured landscape (landscape 5) on the basis of what can be interpreted as cultural determinants in that he found it to be "lifeless", "artificial", and "inaccessible". Respondent 17's inconsistency in selecting his preferred landscape in the biological mode while rejected their unfavoured landscape in the cultural mode can be interpreted as suggesting that selection and rejection can be made using not just different criteria, but wholly different categories of criteria.

The risk involved in inferring determinants of preference based on environmental attributes is again highlighted with respondents 5, 8, and 13 selecting the lightly managed open park type environment in landscape 8 as the landscape closest to their ideal. Although preference for this type of landscape might suggest a biological determinant, in that it corresponds with the factors suggested by Kaplan and Kaplan (1989) and Appleton (1975) as being innately attractive, respondent 5 justified the selection based on cultural constructs in that it appears suitable for family and social activities, while respondents 8 and 13 justified their preference with a mixture of biological and cultural constructs. Further evidence of the modal change when selecting and rejecting landscapes is found in that Respondent 5 rejected landscape 5 on a mixture of cultural and biological constructs while Respondent 13 rejected landscape 4 on the biological grounds that it was restrictive and unstimulating.

Common to each respondent was a preference for landscapes (landscapes 1, 8, and 9) that are consistent with preferences found in other studies, namely those that are open (but not exposed), in which there is a high degree of depth, and a moderate-to-high degree of complexity (Ulrich, 1983; Kaplan and Kaplan, 1989). A notable feature of these results however is that some respondents, despite the focus on urban environments, selected their favoured landscape on the grounds of biological determinants while others selected their favoured landscape on the expected grounds of cultural determinants. Similarly, it appears that biological determinants are evident in the rejection of urban landscapes, which could otherwise have been predicted to be culturally determined. This result provides some evidence to support Bourassa's (1990) paradigm that individual differences can have either a cultural or biological determinant. It cannot be concluded that the consistency of preference is evidence of either a cultural or biological preference mode but rather that, in the cases of the consistently preferred landscapes, the cultural and biological are aligned.

Community appearance, as Nasar (2002) points out, matters to people and, since nature is important for city dwellers, it follows that cities will be improved if urban nature is made more attractive to residents. So if a city is to be improved with respect to nature, some interventions are required. Matthies and Kroemker (2000, p.65) point out that interventions should "optimally be tailored to the specific situation by involving the target group right from the planning stage of the intervention". Priskin (2003) points out that public acceptance of management strategies, or interventions, is affected by the way people perceive the environment. However, determining how individuals perceive the urban environment is a necessary, although problematic, step in identifying meanings that may become commonly shared. To answer whether there could be a universal recipe for what constitutes "better" urban nature or whether the quality of urban nature will be culturally interpreted, we have attempted to determine whether urban nature is appreciated the same by all people

(biological) or whether it is something that we learn (cultural).

It has been proposed that people assess their environment in urban areas in the cultural mode and that people assess natural areas in biological mode (Bourassa, 1990). The tripartite paradigm suggests that we could expect the boundary to become blurred when considering a spatial overlap of both landscape types, as is found in urban green spaces. This appeared to be the case in some respondents however, in others, evidence was found that the urban green stimulus landscapes were either selected or rejected based primarily upon apparently separated biologically or culturally relevant constructs. This is not to say that those who assess a landscape in cultural mode are more culturally developed than those who assess in biological mode but rather that some landscapes appealed to some individual's pre-cognitive aesthetics while other landscapes appealed to some individuals' cognitive and chosen aesthetics.

This research provides evidence to support the paradigm, put forward by Bourassa (1990), that it might indeed be the case that there are both cultural and biological ways of reacting to nature, which dictate our preference. This was revealed by looking at this paradigm from the constructionist perspective in which things are defined by the contrast of what they are not as well as by what they are, and by examining both preferred and rejected landscapes. However, preference for a particular landscape based on either a biologically or culturally relevant concept suggests, but doesn't prove, that such preference exists within the brain at the precognitive or cognitive level. Further research is required to examine the generalizability of these results and, on a larger scale, in establishing an empirical basis for a theory of landscape preferences.

The tendency to select using one mode, and to reject using another, suggests that management of urban green spaces cannot rely on a blueprint of what has been successful elsewhere, but that any interventions should be carefully tailored to the needs of stakeholders on a case-to-case basis. It will be the challenge for future research to find ways to translate such needs into strategies that match urban natural resource management with the needs of residents. The results of this study suggest that seeking to align both the cultural *and* the biological determinants of landscape preference will contribute to achieving this goal. The first step is acknowledging that such a distinction exists.

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SECTION 2 QUANTITATIVE PHASE

Reviewing literature and integrating the results of the qualitative phase of this study led to the formulation of the following research questions which form the backbone of the quantitative phase.

Research **question 1** is:

1) which external influences have a role in the development of a worldview?

Hypotheses:

H 1 An individual's ecological worldview is mediated by culture, knowledge and familiarity with nature.

H 2 Residents of different regions within Switzerland have different worldviews.

Research **questions 2 and 3** are:

2) What are the roles of urban nature in Switzerland?

3) How is the role assigned to nature decided by an individual?

Hypothesis:

H 3 The ecological worldview held by an individual defines the role they assign to urban nature.

Research **questions 4 and 5** are:

4) Is there a species suitable for flagship status?

5) Does the presence of flagship species influence attitudes towards urban nature?

Hypotheses

H 4 Presence of a flagship species enhances appreciation of urban landscapes.

H 5 Presence of an uncharismatic indicator species does not enhance appreciation of urban landscapes.

CHAPTER 4

Measurement of an Ecological World View in Switzerland: The New Ecological Paradigm Revisited

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Abstract

Understanding the wishes of stakeholders is of fundamental importance when designing environmental management strategies or interventions. This study aims to measure whether cultural background influences the ecological worldview held by an individual and whether the worldview in turn influences local scale pro environmental attitudes or behaviour. Environmental worldview was measured by an individual's endorsement of the Dunlap et al.'s (2000) New Ecological Paradigm (NEP) and used to predict local scale pro environmental attitudes or behaviour such as interest in natural areas for recreation and membership of an environmental organization. Although three items were removed from the scale due to a lack of internal consistency, endorsement, or rejection, of the adjusted NEP was found to be a useful predictor of local scale pro environmental attitudes or behaviour. Measurement of endorsement of the adjusted NEP can thus contribute to matching management strategies with the wishes of stakeholders.

Introduction

Governments have committed to halting biodiversity loss by 2010 and, if the targets are to be reached, management decisions must be made. Hunter and Rinner (2004) argue that academic researchers, conservation activists, local policy makers, and land managers should be particularly interested in the public environmental perspectives in relation to species conservation. Conservation biologists contribute to the design of interventions to enhance biodiversity, and the success of intervention strategies is dependent on their acceptance by residents. Acceptance will increase when, as Kaplan and Kaplan (1989) have suggested, nearby natural areas are designed and managed in ways that are beneficial for people and appreciated by them. Priskin (2003) asserts that an understanding the wishes of stakeholders is of fundamental importance when designing management strategies or interventions, however Hunter and Rinner (2004) point out that decision makers are often faced with stakeholders who hold distinctive outlooks toward the appropriate relationship between humans and their environment.

One outlook that has featured prominently in publications by both the scientific community and the popular media is concern for the environment (Marquart-Pyatt, 2007). Knowledge of the degree of environmental concern held by a public is important when designing interventions and/or communication strategies (Hunter and Rinner, 2004), although it is not known whether any translation from concern for the environment to support for pro environmental attitudes or behaviour automatically occurs and, if so, whether it is a human condition or is itself culturally bound.

Furthermore, definitive evidence has not yet been presented that levels of environmental concern are similar across national contexts *(*Marquart-Pyatt, 2007*).* In Switzerland for example, Brechbühl and Rey (1998) found that different language regions seem to cope with nature in different ways and that the German speaking part of Switzerland had a greater interest in nature. Dietz et al. (2005) point out that social interactions and the cultural context within which we live are clearly influential to how we view the environment. They argue that the observed behaviours of others who live in our communities are likely to have a profound influence on us and can be seen as cultural norms. An understanding of the general environmental concern, or ecological worldview, and how it influences local scale pro-environmental attitudes and behaviours would allow environmental communication and interventions to be tailored (Hunter and Rinner, 2004) to enhance both human and non-human life.

Measurement of an Ecological World View

Marquart-Pyatt (2007) concluded that the method of measurement of environmental concern is of consequence when describing its composition and identifying its underpinnings. Several scales to assess public attitudes toward general environmental issues have been developed. Examples include Dunlap and Van Liere's (1978) "New Environmental Paradigm" which measures an ecological worldview, Maloney and Ward's (1973) "Ecology Scale", which measures ecological attitudes and knowledge, Stern et al.'s (1993) self descriptive "Awareness of Consequence Scale", Weigel and Weigel's (1978) "Environmental Concern Scale", which measures environmental concern and the behavioural adaptations that people are willing to make, and Steel et al.'s (1994) "Forest Values Scale", which measures attitudes toward forest resources along an anthropocentric to biocentric continuum.

The most studied of these measurement tools is the New Environmental Paradigm, which has been used in a wide variety of geographic and cultural contexts (Hunter and Rinner, 2004). Rauwald and Moore (2002) tested several predictors of support for environmentally protective policies and found the revised New Ecological Paradigm to be the most reliable. Criticisms of the New Environmental Paradigm have been that the language used is outdated (Lalonde and Jackson, 2002), that the dimensionality of the scale has never been established, (Dunlap et al. 2000), and that it lacks a theoretical underpinning upon which to interpret results (Lundmark, 2007).

In addressing the problems with outdated terminology of some questions in the New Environmental Paradigm, and to accommodate an increasingly sophisticated public with an expanding knowledge of environmental issues (Lalonde and Jackson, 2002), Dunlap et al. (2000) later revised the scale to a 15 item scale and slightly altered the name to the New Ecological Paradigm (NEP) to acknowledge the synergistic relationship between society and environment. The NEP scale is shown in full in table 1, and consists of 15 statements with eight statements worded so that agreement indicates a pro-ecological worldview (the odd-numbered items) and seven statements worded so that disagreement indicates a pro-ecological worldview (the even numbered items). Responses from individuals holding ecocentric worldviews tend to endorse the NEP by rejecting human exemptionalism, acknowledging limits to growth and resources, and being aware that upsetting the balance of nature may cause an ecocrisis. Responses from individuals holding anthropocentric worldviews tend toward the scale"s opposite pole, by endorsing the Dominant Social Paradigm (DSP), which reflects the belief that humans are not subject to the laws of nature (Dunlap et al., 2000).

Dunlap et al. (2000, p.431) acknowledge the difficulties in establishing the dimensionality of the scale and suggest that "the decision to treat the NEP as a single variable or as multiple

variables should not be made beforehand but ought to be based on the results of the particular study". Furthermore, they warn against the creation of "ad hoc dimensions that emerge from various factoring techniques" (Dunlap et al., 2000, p.431). Hunter and Rinner (2004) found that the revised version of the NEP scale does measure a single identifiable construct although they add the caveat that item 9, which states that humans are still subject to the laws of nature, consistently contributes less to the dominant construct. However, while the emergent dimensionality is of great interest in the interpretation of results, questions of the ability of the NEP to measure the structure and coherence of ecological worldviews have been based more recently on the theoretical underpinnings of the scale.

The issue of a lack of a paradigm with which to interpret results has been addressed by Lundmark (2007, p.329) who concluded that "pronounced forms of anthropocentrism are well captured by the scale, while the environmental position is 'shallow' rather than 'deep green' and misses crucial elements of the contemporary environmental ethics debate". She concluded that, while measurement of an individual's environmental ethics, expressed as ecocentric orientation is beyond the capacity of the NEP, the scale is a useful instrument to explore the support for ecological beliefs both within and between specific groups of individuals (Lundmark, 2007). Given that that is precisely what this study aims to achieve, it appears that the NEP is an appropriate instrument with which to proceed.

State of Knowledge

Studies have shown that people's cultural and ethnic background, and their familiarity or experience with a setting, influence their landscape preferences, which in turn reflects the extent to which the landscape meets the individual's needs (Lindemann-Matthies and Bose, 2007). Merchant (1992) suggested that individual or societal environmental practices will be consistent with the ethical grounding to which individuals or societies adhere. Schultz and Zelezny (1999) examined the relationships between values and environmental attitudes in a study across 14 countries and found that environmental beliefs were significantly different according to the dominant culture allowing the conclusion that culture acts as a mediating influence between values and beliefs. The NEP has been used to compare the environmental worldviews of students in several Latin American nations and Spain with those of American students (Bechtel et al., 1999; Bechtel et al., 2006; Schulz and Zelezny, 1999) and of Brazilian students with Norwegian students (Vikan et al., 2007). The NEP has also been used to examine the environmental orientations of ethnic minorities in the United States (eg, Caron, 1989; Noe and Snow, 1989-1990; Johnson et al., 2004) as well as of residents of other nations such as Canada (Edgell and Nowell 1989), Sweden (Widegren, 1998), the Baltic states (Gooch, 1995), Turkey (Furman, 1998), and Japan (Pierce et al. 1987). In general these studies have found a relatively strong endorsement of NEP beliefs across the various samples although inter-group differences were found in each of these studies.

Several demographic variables have been consistently found to correlate with responses to the NEP. Jones and Dunlap (1992) and Lowe et al. (1980) found that urban residents are more environmentally concerned than rural residents although Jones et al. (1999) and Jussaume and Higgins (1998) found little difference between the environmental concern of rural and urban residents. Lowe et al. (1980) and Van Liere and Dunlap (1980) found that the level of education attained by respondents is positively correlated with concern for the environment although Jones and Dunlap (1992) reported a weak association and Samdahl and Robertson (1989) reported a negative association. Correlations between environmental concern and both education level and where an individual lives on the rural/urban gradient appear then to be case specific and difficult to generalise.

Edgell and Nowell (1989), Pierce et al. (1992) and Widegren (1998) found that members of environmental organizations score higher on the NEP Scale than do the general public or members of interest groups that are not environmentally focussed. It is not clear however, whether information gained during membership increases concern, or whether the environmentally concerned tend towards membership of such organizations. Hay (2002) writes that identification with the green movement, which could reasonably be considered to be a precondition for membership of an environmental organization, is neither theoretical nor intellectual, but rather pre-rational, and is a reaction to the scale of the environmental destruction commited in the second half of the twentieth century. This would suggest that ecological concern is increased during membership and, as Hunter and Rinner (2004) suggest, is correlated with general ecological knowledge.

Goken et al. (2000), Jones and Dunlap (1992), Lowe et al. (1980), Theodori et al. (1998) and Van Liere and Dunlap (1980) reported a negative correlation between age and NEP scores, however Dietz et al. (1998) and Samdahl and Robertson (1989) found no relationship. Dunlap et al. (2000), in their longitudinal study, found that age was negatively correlated with NEP scores yet report a modest increase in NEP scores. Their respondents had become 14 years older between responding to the questions and, since the first study, endorse the NEP more, rather than less, strongly. This general shift towards endorsement of the NEP in their sample appears to have been relatively constant across age groups. A possible explanation is that respondents had generally become more informed between the studies and their ecological awareness had consequently increased.

Given that inconsistencies have been found between responses to the NEP by different groups of respondents, it is reasonable to suspect that responses by Swiss respondents may differ from those found in previous study Therefore, it can not be assumed that the relationships between NEP scores and predictor variables will hold in Switzerland and the

findings from previous study cannot be applied in the Swiss context without primary research. The research project designed to address this gap is described as follows.

Method

The **aim** of this study is to answer the following two research questions:

1) Do residents of the different language regions within Switzerland have different ecological worldviews?

2) Does the ecological worldview held by an individual influence their pro ecological attitudes and behaviours on a local scale.

The secondary aim of this study is to contribute to the ongoing discussion on the dimensionality and reliability of the NEP by examining the NEP scale in the Swiss context.

The **sample** consisted of 4000 randomly selected households from throughout Switzerland. The first person in the household aged sixteen years or over to have a birthday in the calendar year was asked to take part in the survey. Out of the 4000 questionnaires sent out, 163 from 636 in Italian (response rate 25.6%), 274 from 1258 in French (response rate 21.7%), and 462 from 2034 in German (response rate 22.7%) were returned, giving a total of 899 completed returns, and a response rate of 22.9%.

Instrument

Several of the items in the New Environmental Paradigm have proven to be difficult to translate (Schultz and Zelezny, 1999) and a nationwide survey in Switzerland covers three dominant language regions. Bilingual English/German, and English/Italian speakers translated the English language version of the NEP scale into their respective languages, and the translated versions were translated back into English. The results were then compared with the original English versions. The translators then discussed the differences and negotiated final translated versions that were deemed to be as close as possible in meaning to the original scales. As only one bilingual French/English speaker was available, the French versions were translated by a professional translator, and checked for accuracy by the French/English speaker.

Pro ecological attitudes and behaviours on a local scale were measured by asking whether respondents were members of an environmental organization, measuring preference for threatened over common and for native over exotic species, and asking whether the respondents seek natural areas to engage in any of a supplied list of nature based recreation activities. The list included Nordic walking, cycling, walking, ball games, dog walking, jogging, meeting people, reading, picnicking, and passing time.

Results

Analysis was carried out using SPSS version 16.0.1. The results of all pairwise comparisons are reported after a Bonferroni adjustment.

The frequencies of responses to the NEP scale, the corrected Item-Total correlation, and the scale alpha if the item were deleted are displayed in table 1.

	Strongly Agree	Mildly Agree	Unsure	Mildly Disagree	Strongly Disagree	N	Corrected Item-Total Correlation*	Alpha if Deleted
1. We are approaching the limit of the number of people the earth can support.	27.6	38.8	12.9	13.4	5.5	886	.259	.757
2. Humans have the right to modify the natural environment to suit their needs.	5.3	15.0	12.3	33.7	31.6	883	.390	.744
3. When humans interfere with nature, it often produces disastrous consequences.	46.9	33.5	8.1	7.9	1.8	885	.421	.741
4. Human ingenuity will insure that we do not make the earth unliveable.	10.1	24.2	17.7	28.9	16.6	880	.424	.740
5. Humans are severely abusing the earth.	53.2	31.3	4.9	6.7	2.2	886	.442	.740
6. The earth has plenty of natural resources if we just learn how to develop them.	59.5	30.4	4.7	2.7	1.0	886	-.027	.773
7. Plants and animals have as much right as humans to exist.	70.1	19.0	4.7	3.4	1.2	887	.332	.750
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.	2.9	6.8	7.6	37.0	44.0	887	.467	.737
9. Despite our special abilities, humans are still subject to the laws of nature.	70.0	22.6	2.2	2.0	1.4	886	.181	.760
10. The so-called “ecological crisis” facing humankind has been greatly exaggerated.	6.4	17.7	12.3	30.7	30.9	885	.420	.741
11. The earth is like a spaceship with very limited room and resources.	26.8	35.5	17.3	13.5	4.8	883	.339	.749
12. Humans were meant to rule over the rest of nature.	4.1	7.9	11.1	20.8	54.1	884	.402	.743
13. The balance of nature is very delicate and easily upset.	54.5	31.3	5.7	5.1	1.9	888	.399	.744
14. Humans will eventually learn enough about how nature works to be able to control it.	3.4	13.0	15.1	34.5	31.9	883	.417	.741
15. If things continue on their present course, we will soon experience a major environmental catastrophe.	36.6	39.2	11.1	9.2	2.2	887	.488	.735

*Item-total correlations reflect the correlation between the single item and the total score of the scale excluding itself. Typically, 0.30 is seen as a threshold value below which the item is not considered a good indicator of the overall scale (Hunter and Rinner, 2004).

Table 1 Responses to the NEP scale

The full scale, with all 15 items included, returned a Cronbach”s alpha of 0.759 with all respondents included. However, the alpha value increased to 0.773 if Item 6 were deleted and this item was flagged for attention. The total percentage agreeing with a pro-NEP stance was calculated for each item and the mean endorsement of the NEP from this sample was 69.02%, although with item 6 removed, the mean endorsement rose to 73.69%. An NEP score was calculated for each respondent by reversing the coding of the even numbered items and summing the scores.

A univariate analysis of variation of NEP score against the language spoken by the respondent found that language spoken was a significant (p=0.006) predictor of NEP score. Pairwise comparisons revealed that the difference between the German speakers and the

Italian and French speakers was significant (p=0.016 and 0.036 respectively). There was no significant difference (p=1.00) between French and Italian speakers, which suggested that the data set should be split into German speakers and non-German speakers.

Examining the scale responses from German speakers found a Cronbach"s alpha of 0.763 and the scale alpha with item 6 deleted improved to 0.778, while the scale alpha with item 1 deleted improved to 0.765. Another means of assessing internal consistency is via principal axis factoring analysis (Dunlap et al. 2000). An unrotated principal axis factoring analysis revealed that all of the items loaded against the first component except items 6 and 1, which loaded against components of their own, so they will be treated separately.

Examining the scale responses from French and Italian speakers found a Cronbach"s alpha of 0.751 although the scale alpha with item 6 deleted improved to 0.767, while the scale alpha with item 9 deleted improved to 0.758. An unrotated principal axis factoring analysis revealed that all of the items loaded against the first component except items, 1, 6 and 9, which each loaded against a separate component, and therefore suggests they should not be treated as representing the same construct as the remaining 12 items.

Items 1, 6, and 9.

Language spoken was found to be not a significant predictor of responses to item 1. For item 6, there were significant differences (p=0.00) between the Italian speakers (mean = 1.21) and German speakers (mean = 1.68) and also (p=0.004) between Italian and French speakers (mean = 1.533). For this item, closer to 1 means that the respondent is more in agreement with the statement that the earth has limited resources. The data set was therefore divided into Italian speakers and non-Italian speakers for the examination of responses to item 6. For item 9, closer to 5 means that the respondent agrees that we are dependent on the laws of nature. There was a significant difference (p=0.00) between French (mean = 4.45) and German speakers (mean = 4.78) so the language groups will be treated separately when examining item 9.

Responses to items 1, 6, and 9 were regressed against four demographic variables, namely membership of an environmental organization, age, level of education, and where the person lived along a rural urban gradient. The results of these regressions, by language group, are displayed in table 2.

Item	Language	Env org	Age	education		Urban rural	
		P value	P value	P value	beta	P value	beta
1	All	0.006**	0.21	0.09		0.035*	-0.07
6	Italian	0.29	0.55	0.21		0.94	
	Non Italian	0.36	0.08	0.001**	0.124	0.08	
9	German		0.59	0.20		0.84	
	French	0.10	0.15	0.08		0.37	
	Italian	0.25	0.73	0.30		0.97	

Table 2: regression of variables 1, 6, and 9 against demographic variables

Scale with items 1, 6, and 9 removed

A re-examination of the adjusted scale (with items 1, 6, and 9 removed) found a Cronbach's alpha of 0.774. An unrotated principal axis factor analysis found that all 12 items loaded against the first factor, which explained 29.17% of the variance. Language was no longer significant and neither education level (p=0.46) nor whether the respondents lived along a rural/urban gradient (p=0.53) were found to be statistically significant predictors of responses to the adjusted NEP. It was found that adjusted NEP scores were negatively correlated with age (p=0.001, Beta = -0.1).

Members of an environmental organization are significantly more likely (p=0.00) to return higher scores on the adjusted NEP than non-members. Those who prefer rare over common species are more likely to endorse the adjusted NEP (p=0.004) however, with the exception of walking (p=0.00), the adjusted NEP was found to not a significant predictor of the likelihood of a respondent searching for natural places in which to engage in recreational activities.

To examine the dimensionality of the adjusted scale, a principal axis factor analysis with varimax rotation was carried out with the results shown in table 3. The three factors explained 15.5%, 12.5%, and 7.3% of the variance respectively.

		Factor				
No.	Scale item	1	2	3	Mean	S/D
5	Humans are severely abusing the earth.	.669			4.29	0.99
3	When humans interfere with nature, it often produces disastrous consequences.	.625			4.18	1.00
15	If things continue on their present course, we will soon experience a major environmental catastrophe.	.597		.385	4.00	1.03
13	The balance of nature is very delicate and easily upset.	.500			4.34	0.94
7	Plants and animals have as much right as humans to exist.	.369			4.56	0.84
11	The earth is like a spaceship with very limited room and resources.	.321			3.67	1.16
12	Humans were meant to rule over the rest of nature.		.618		4.15	1.16
14	Humans will eventually learn enough about how nature works to be able to control it.		.570		3.80	1.14
4	Human ingenuity will insure that we do not make the earth unliveable.		.466		3.18	1.27
8	The balance of nature is strong enough to cope with the impacts of modern industrial nations.		.454	.387	4.14	1.02
2	Humans have the right to modify the natural environment to suit their needs.		.424		3.73	1.25
10	The so-called "ecological crisis" facing humankind has been greatly exaggerated.			.605	3.63	1.27

Table 3 Principal axis factor analysis of adjusted NEP items (varimax rotation)

Discussion

Hunter and Rinner (2004) eliminated item 9 from the scale on the grounds that it demonstrated the lowest factor loading in a principal components analysis and, if removed from a summative scale, the scale's Cronbach's alpha would increase. The results of this study support Hunter and Rinner's (2004) finding, although applying the same rejection criteria suggests that items 1 and 6 should be removed as well. These three items did not correlate sufficiently with the remaining 12 items for them to be reasonably considered to be measuring the same variable and this result means that the New Ecological Paradigm scores from this Swiss sample cannot be directly compared with the results of other studies. This discussion will therefore examine the removed items individually and separately from the examination of the adjusted NEP scale.

item 1: *We are approaching the limit of the number of people the earth can support.*

In contrast to this study, item 1 has consistently been retained as part of the NEP. Dunlap et al. (2000) report that 20% of respondents answered item 1 with "unsure" although the relatively strong inter item total correlation led them to retain this item in the full NEP scale. This does not suggests a failing of the item itself, but rather that the item is not consistently understood in all cultural contexts. Presumably, in the Swiss sample, respondents added an individual proviso at the end that modified their understanding of what the statement was precisely saying.

The question of population, and the human carrying capacity of the Earth, is central to ecocentrism. Naess (1989, p. 29) wrote that the "flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of non-human life requires such a decrease". In this study, people living in the country ($p=0.035$, Beta = -0.07) are more likely than those living in the city to agree with item 1. Jones et al. (1998) hypothesised that urban residents are significantly more knowledgeable about environmental issues, and more environmentally concerned, than rural residents. Their assumption is that knowledge and environmental concern are related, however this study found that age ($p=0.212$) and education level ($p=0.085$) were not found to be significant predictors of responses to item 1. An alternative explanation for this result is that people who are averse to crowds might tend to choose rural areas as their place of residence. On the other hand, members of environmental organisations are significantly ($p=0.006$) more likely to endorse item 1 which is possibly related to the exposure to people holding ideals close to Naess" (1989) "deep ecology", who could be expected in an environmental organization.

Item 6: *The earth has plenty of natural resources if we just learn how to develop them.*

Item 6 produced results consistent with those of previous studies although nonetheless contrary to what theory suggests should be expected. Disagreement with the statement contributes to endorsement of the NEP, and this stance was taken by just 3.7% of the respondents with 4.7% unsure. However, revisiting the published results of previous study shows that this expected result is often reversed. Dunlap et al. (2000) found that 29.5% of their respondents either disagreed or strongly disagreed with the statement with 11.3 % unsure, while Hunter and Rinner (2004) found that 39.1% of their respondents either agreed or strongly agreed with the statement with 14.3% unsure. The acceptable item-total correlation (0.34 and 0.41 respectively) in these studies led to the retention of item 6 in the scale in their studies. Similarly, Vikan et al. (2007) reported mean responses of 3.23, 3.10, and 2.43 (on a 5 point likert scale) from the three groups in their study, so it appears that their respondents also did not show a clear rejection of the statement. Curiously, none of these three studies mentioned the reversal in their discussion although it can be reasonably concluded that there are a range of potential understandings of the statement. The item was however discussed by Rideout et al. (2005, 22) who commented on “a clear reluctance for respondents to take an ecological view of the statement”.

The notion that there are plenty of natural resources rejects physical limits to the growth of human societies and suggests that the only limits are those of human capacity. Rideout et al. (2005) offer a possible explanation for the unexpected reversal as that respondents do not sufficiently understand the use of the word “develop”, which may be understood as synonymous with “use”. If we assume that people understand the statement as referring to present demand for resources, then the result is not surprising. If however, we assume that people understand the statement as referring to the future demand for resources, the proportion of agreement is indeed surprising. Lundmark (2007) points out that these ideas of abundance seem particularly ill timed and obsolete when contemporary political practice is aiming to reach ecological, economical and social sustainability. She states that “More updated anthropocentric expressions and manifestations are likely to recognize limits in human–nature relations” (Lundmark, 2007, p. 340).

In this study, there were significant differences ($p=0.00$) in responses to item 6 between the Italian speakers (mean = 1.21) and German speakers (mean = 1.68) and also ($p=0.004$) between Italian and French speakers (mean = 1.533). German speaking respondents were more in agreement with the statement that the earth has plenty of natural resources, the French speakers less so, and the Italian speakers even less. Cultural differences relating to item 6 have been noted by Catton and Dunlap (1980) who comment that the belief rooted in American culture is that the continent has an abundance of resources has existed since the industrial revolution. Although, it might be that the belief in abundance of resources, and

consequently on no limits to growth, is more valid in the USA than in Europe (Lundmark, 2007), the vast majority of respondents in this study see resource supply as a management issue, independently of their environmental concern.

Now looking at item 6 for non-Italian speakers, education was a significant (p=0.001, Beta =0.124) predictor, which suggests those with lower education levels believe that the resources of the earth are plentiful while those with higher education levels believing the same but less so. Interestingly, membership of an environmental organization was not a significant predictor (p=0.362) of a response to this statement. For Italian speakers, none of the variables tested Age (p=0.554), education (p=0.21), rural/city (p=0.94), environmental organisation (p= 0.297) were significant predictors of response. There are two possible conclusions. Either people understand the question differently and are possibly unsure whether the question refers to the present demand or future demand for resources, or people have different perceptions of the supply of the Earth"s resources. In the absence of interviews with the respondents to learn what they did understand by the statement, it is only possible to speculate as to the reasons for the unexpected, yet consistent, results.

Item 9: *Despite our special abilities, humans are still subject to the laws of nature.*

Item 9 was also found by Hunter and Rinner (2004) to correlate poorly with the rest of the NEP. Being an odd numbered item, a response closer to 5 means that the respondent agrees that we are dependent on the laws of nature and signals endorsement of the NEP. This suggests that there are natural limits to the growth of human society, regardless of the creativity and ingenuity of humans (Catton and Dunlap, 1980)

There was a significant difference (p=0.00) between French (mean = 4.45) and German speakers (mean = 4.78) so all there language regions were examined separately. Regressing the responses to item 9 against the target variables (Age, membership of an environmental organization, level of education, and place of residence) found there to be no significant differences. Lundmark (2007, p. 337), however, points out that the "item on the laws of nature does not unequivocally work to discriminate between anthropocentric and more ecocentric beliefs". Given that the laws of nature are, as their name suggests, laws, and the apparent and indisputable circumstance that humans are part of nature, "reliance on the laws of nature does not indicate devotion to any particular form of environmental ethics" (Lundmark, 2007, p. 337). Responses to this item are therefore dependent on the interpretation of what the statement means, and we cannot know how people understood the statement without further inquiry. What is clear is that the poor correlation with the remaining scale items suggests that, in the Swiss context, the item was not understood as Dunlap et al, (2000) intended it to be understood.

The Adjusted NEP Scale

The mean percent agreement with the NEP, at 69.0% was marginally higher than the 66.5% reported by Dunlap et al. (2000). Although this supports Dunlap et al.'s (2000) observation of a drift towards pro-ecological thinking, it is also possible that these differences may be explained by cultural variation and direct comparison between mean endorsements do not allow confident conclusions. However, relationships between endorsement of the NEP and demographc variables does afford comparison with previous study.

A principal axis factoring with varimax rotation found that the remaining 12 items separated out into factors that correspond to the odd and even numbered items. This suggests that, although there is a strong endorsement of the NEP across the sample, there is not an outright rejection of the dominant social paradigm (DSP) and the DSP items weren't rejected as strongly as the adjusted NEP items were endorsed. This, along with the consistent endorsement of the NEP found in most studies suggests that the move towards the NEP is more of a drift than a leap. Lundmark (2007) suggests that shallow ecology might currently constitute the DSP and that a more accurate label may be The Dominant *Ecological* Paradigm. However, given that the DSP and the adjusted NEP are different ends of the same scale, the adjusted scale can be reasonably be treated as being a single variable.

Switzerland is in the rare situation where 3 distinct cultural groups share the same nationality and coexist with similar, and comparatively high, levels of income, quality of life and environmental quality. Group differences can therefore be reasonably assigned to cultural differences. However no significant differences were found between the responses to the adjusted NEP from the different language regions. Brechbuhl and Rey's (1998) finding that residents of the German speaking part of Switzerland had a greater interest in nature did not transfer, in this study, to a greater degree of environmental concern. Similarly, no evidence was found to contradict the findings of Jones et al. (1999) in that no significant differences between urban and rural residents was found.

The results of this study confirm those of Goken et al. (2000), Jones and Dunlap (1992), Lowe et al. (1980), Theodori et al. (1998) and Van Liere and Dunlap (1980) in that a negative correlation between age and NEP scores was found. Younger people are expected to be more open towards environmentally directed worldviews than older generations as they "… have been exposed to the competing DSP for a shorter period of time" (Dunlap and Van Liere, 1978, p. 16). On the other hand, Dietz et al. (1998) and Samdahl and Robertson (1989) found no relationship between Age and NEP score. An alternative, and perhaps complementary, explanation could be that older people have become desensitised to predictions of environmental catastrophe over time, resulting in a world weariness and lessened concern.

With the exception of walking, the adjusted NEP was found to be a poor predictor of the likelihood of a respondent searching for natural places in which to engage in recreational activities. Consequently, observing recreational behaviour in natural areas does not allow conclusions as to the ecological worldview held by the participants. Furthermore, this study found no significant relationship between the education level attained by a respondent and their responses to the adjusted NEP. This finding is in contrast to Lowe et al. (1980), Van Liere and Dunlap (1980), Jones and Dunlap (1992) and Samdahl and Robertson (1989) who explain the correlations that they found between education level and NEP score by proposing that people with higher levels of education are more likely experience greater exposure to environmental information, and are also more likely to be able to comprehend that information and consequently to endorse the NEP, than those who are less educated.

This discrepancy is perhaps due to the virtually universal access to information that the general public in Switzerland has, with the consequent widespread awareness of environmental consequences. Since concern appears to be a human characteristic, and information is not restricted to the educated, it is hardly surprising that education level is not a significant predictor. One group however, that can be expected to experience even greater exposure to environmental information are members of environmental organizations. In this study, like those of Edgell and Nowell (1989), Pierce et al. (1992) and Widegren (1998), it was found that membership of an environmental organization was a significant and positive predictor of NEP scores.

Conclusions

By way of conclusion, it is worth revisiting the aims of the study. The secondary aim of this study was to contribute to the ongoing discussion on the dimensionality and reliability of the NEP by examining the NEP scale in the Swiss context. It was found that the adjusted version of the NEP with items 1, 6, and 9 removed was unidimensional and that the factoring that occurred was related to the design of the scale. The wording of the questions so that endorsement of the NEP required alternating between agreement with the NEP items and disagreement with the DSP items, allowed a measurement of the acceptance of one and rejection of the other simultaneously. It was found that the NEP was strongly endorsed, although the DSP was not as strongly rejected. However it was found that items 1, 6, and 9 did not measure the same construct as the remaining items and could not be retained in the scale. It appears that, in the Swiss context, the statements forming these items were not understood as the scales designers intended. However, Items 1, and 6 represent two of the scale”s three items that deal with the issue of limits and it can be concluded that scale is deficient in its ability to measure attitudes towards limits in the Swiss context. It appears likely, in light of the relatively high endorsement of the NEP, that it is a question of

respondents not understanding exactly what the items mean. Furthermore it could be concluded that the difference in understanding is cultural.

This study has shown that there are indeed different ecological worldviews within the different language regions of Switzerland although the differences are subtle and complex. The differences were most apparent in items 6 and 9 of the NEP and how responses to those items changed across the various demographics. Similarly, it was found that the ecological worldview held by an individual does influence their pro ecological attitudes and behaviours on a local scale. Those who endorse the NEP are more likely to be members of environmental organizations and are more likely to prefer rare over common species. Provision of information about general environmental consequences seems to increase endorsement of the NEP. Therefore, as Hunter and Rinner (2004) have suggested, provision of general information about ecological consequence could be a tool for those working towards preservation of specific individual species or habitats.

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Chapter 5

Psychosocial Outcomes as Motivations for Visiting Nearby Green Spaces

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Abstract

Studies into the psychosocial benefits of contact with nature have tended to focus on contact with large-scale wilderness areas yet high-density urban living means that urban green spaces are important nodes of contact with nature. Little is known however about what psychosocial outcomes residents gain from contact with nature in urban environments. This study aims to address this knowledge gap and to measure whether the outcomes that are often ascribed to wilderness immersion can be obtained in the urban setting. A random sample of Swiss residents were presented with Shin et al.'s (2005) psychosocial outcomes scale and were asked which activities they choose to undertake in nearby natural areas. It was found that the most important motivations for visiting nearby green spaces were related to restoration and that social bonding is a desirable side benefit rather than a motivation in its own right. Social bonding however is a more important motivation for older people, while younger people are more strongly motivated by the desire to escape the everyday life. Furthermore, there were few observable differences between urban and rural residents. It appears therefore, that urban green spaces provide a necessary substitute for contact with nature on a larger scale.

Introduction

We live in a rapidly urbanising world. It is estimated that 47% of the world's population lived in urbanised areas in 2005 and this amount is expected to rise to 60% by the year 2030 (United Nations, 2005). In Switzerland, 75% of today's population lives in agglomerations with an expected increase to 83% in the year 2030 (United Nations, 2005). As the built environment intensifies, with the understandable aim of preventing the spread of the urban into the surrounding areas, the growing populations require housing and services. This in turn brings pressure on decision makers to release green spaces within urban areas for development. The higher density urban living that results from the loss of green spaces to development has potentially significant implications for citizens because of the importance of urban green spaces as nodes of contact with nature (Barthel et al., 2005). Coley et al. (1997) found that natural elements, such as trees, in semi public spaces surrounding urban housing promote increased use by, and interaction between, residents. Urban green spaces that are well used have been shown to encourage bonding between neighbours (Kuo et al. 1998), to provide a greater sense of safety (Kuo et al., 1998), and to reduce urban ills such as crime and violence (Kuo and Sullivan, 2001). Sullivan et al. (2004: 698) put it simply that "clearly, the goal should be to have nature at every doorstep".

De Groot (2005, p.175) states that 'In order to reconcile landscape conservation with changing demands on land use and natural resources, it is essential that the ecological, socio-cultural and economic values of the landscape be fully taken into account in planning and decision-making'. Winter (2005) described means of valuation of natural areas as being related to roles assigned by the valuer and the 'role' of a particular green space is to provide a particular benefit described by Costanza et al. (1997) as an ecosystem service. Among the services that are beneficial to humans provided by ecosystems are cultural ecosystem services, which are defined in the Millennium Ecosystem Assessment (2005) as "the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences." Shin et al. (2005) describe the motivation for an individual to make use of a cultural ecosystem service with the term 'psychosocial outcomes'.

When considering urban green spaces, access and usefulness are consistently important to residents (Home et al., 2007). Access can be defined as the ability of an individual to go to the green space, which implies having legal access, physical access, psychological access (not scared to go there) and spatial access (it is near enough to visit). Whether or not the street takes on new, or renewed, roles within society, it is clear that access to some form of "nature" is a fundamental human need and therefore, a vitally important part of access to open space (Ward-Thompson, 2002). Usefulness is however harder to define but could be

defined as its ability to provide whatever psychosocial outcomes an individual wishes to achieve. The means of providing psychosocial outcomes is to provide a place to undertake activities so that the combination of activity and place produce the desired outcome.

Much of the study that has been carried out into the psychosocial outcomes of contact with nature has dealt with wilderness. Examination of the literature concerning outcomes that people gain by contact with wilderness revealed three broad classifications, namely restoration, self-actualisation, and socialisation. Restoration applies to both physical and mental health and wellbeing, and involves renewing diminished functional resources and capabilities (Hartig and Staats, 2003). Self-actualisation is to fully realise ones potential and was used in the humanistic psychological sense by Maslow (1968) as the pinnacle of his hierarchy of needs. Maslow's (1968) self-actualised person is one who is fully functioning and living an enriched life, or in other words, an ideal of mental health. Socialisation, with regard to wilderness refers to the social activity that takes place during immersion.

However, there has been little study to determine whether the outcomes gained by individuals in wilderness areas can also be achieved in the necessarily smaller urban green spaces. Payne et al. (2000) point out the importance of spatial scale in recreation preferences and behaviours and, in particular, the importance of considering spatial context in leisure research. Golledge and Rushton (1984) comment that spatial context is fundamentally important to the preferences and consequent choices made by individuals.

The aim of this paper is to determine the cultural ecosystem services gained from contact with wilderness can also be provided for Swiss residents by natural or near natural areas near to where they live. A secondary aim is to identify whether urban dwellers have the same demands for cultural ecosystem services as peri-urban and rural dwellers. These aims are addressed by formulating the following research questions.

1) What motivates people to go to natural areas near to where they live?
2) What activities do people undertake in natural areas to achieve their outcomes?

Cultural ecosystem services

Kaplan & Kaplan's (1989) 'Attentional Restoration Theory' (being away, extent, fascination, and compatibility) proposes that nature has properties that attract involuntary attention, thus allowing directed attention to recover and thereby reduce mental fatigue. There is some evidence in the literature that restoration can take place in the smaller scale urban green spaces. Functional benefits of urban ecosystems are primarily Identified as the restorative contrast to the built environment that urban nature provides (Hartig & Staats, 2003). Studies have consistently shown that natural environments are more restorative than urban

environments (Ulrich, 1983) although most have contrasted stark urban environments with natural scenes (Staats et al., 2003; van den Berg et al., 2003; Ulrich et al., 1991), or compared the effects of natural views with the effects of windowless rooms (Hartig et al., 1997). Hernandez and Hidalgo (2005), in one of the few studies examining the restorative effects of nature within cities, similarly found that respondents viewing urban scenes with natural elements returned higher scores on a measure of restorativeness than those viewing the same scenes without the natural elements. Peron et al. (2002) found that mixed environments are often perceived as being as restorative as purely natural environments.

Restoration is differentiated from the related construct of self-actualisation in that restoration has a connotation of recovery while actualisation has a connotation of improvement. Heintzman and Mannell (2003, p.207) showed the relatedness and attempted "to develop a model of leisure style and spiritual wellbeing relationships, the processes (spiritual functions of leisure) by which leisure can influence spiritual well-being and the role of leisure in ameliorating the effects of time pressure on spiritual well-being". They found that certain behaviours and experiences (spiritual functions of leisure i.e. sacralization, repression avoidance, sense of place) maintain or enhance spiritual well-being (both behavioural and subjective) and may also reduce the negative influence of time pressure on spiritual well-being.

Self-actualisation includes learning and self-reflection. Shin et al. (2005) found that the desire to learn was among the most important roles filled by Korean urban forest parks. Shaw (1987) found that untended, or wild, areas are valued more by children than manicured open areas and that a wider variety of spatial situations encouraged play and exploration. Kaplan & Kaplan (1989) observed several benefits of their 'wilderness laboratory' that appear to contribute to self-actualisation such as self discovery, inner peace, acquaintance with ones own thoughts, and contemplation of spiritual meanings and eternal processes. Bogeholz et al. (2006) argue that nature experiences provide an opportunity to develop, recognize and/or reflect upon norms and values. This leads to questions of scale as no study has yet examined whether total immersion in wilderness is required to gain feelings of life enrichment although Beatley (2000) sees the provision of opportunities for personal enrichment as a compelling argument for green urbanism and suggested that it is during leisure's discretionary time that people may seek a deeper connection with others. Driver (1991) argued that the social element of forest recreation is one of the most consistently important motivations for forest visitation although previous studies on the social outcomes of forest recreation have focused on family bonding and friendship during journeys to forests (Shin et al., 2005). Sullivan et al. (2004) found that the presence of trees and grass may be one of the key components of vital neighbourhood spaces because by spending more time in greener

outdoor common spaces, residents actually get to know their neighbours better and end up spending more time socializing with them".

However, it cannot be concluded that the findings of studies into the psychosocial outcomes of wilderness visitation can be transferred to exposure to local scale nature. Furthermore there has been little study into the relationship between the role of local natural areas and demographic variables. Floyd & Shinew (1999) proposed that other sociological and demographic factors might be influential in shaping recreation attitudes and behaviours. It is reasonable to suppose that cultural background may be an influence. Tinsley (2002) found significant differences among ethnic groups in their use of park facilities and in their ratings of the psychosocial benefits of park use. Other demographic differences that have been found to influence use of green spaces in urban areas are age (Payne et al., 2002; Yilmaz et al., 2005) and education level (Shin et al., 2005). Payne et al. (2002) point out however, that there has been insufficient research into age differences with respect to local and regional park attitudes and use".

While many researchers have addressed attitudes toward types of green spaces (such as developed vs. wilderness) and activity preferences (Payne et al., 2002), few have collectively examined the psychosocial outcomes desired by users of green spaces and the activities undertaken to achieve such outcomes. Shin et al. (2005) classified 'psychosocial outcomes' according to the categories of 'learning and self/other relations', 'social and self-development' and 'enjoying nature'. Their study has, however not been replicated in another cultural context and no study has yet examined what activities are undertaken to achieve the desired outcomes. This study seeks to address this research gap while accepting the challenge of Payne et al. (2002) to further study the influences of demographic variables on the use of green spaces.

Method

A mail out survey was sent to a **sample** of 4000 randomly selected households from throughout Switzerland. The first person in the household aged sixteen years or over to have a birthday in the calendar year was asked to take part in the survey. Out of the 4000 questionnaires sent out, 163 from 636 in Italian (response rate 25.6%), 274 from 1258 in French (response rate 21.7%), and 462 from 2034 in German (response rate 22.7%) were returned, giving a total of 899 completed returns, and a response rate of 22.9%.

The **questionnaire** included Shin et al.'s (2005) 'psychosocial outcomes scale', which was derived from a comprehensive study of relevant literature and consultation with recreation professionals. The scale consisted of 16 items that were considered to represent the range of individual outcomes that could be gained from visits to local green spaces. Shin et al's

(2005) 'status' item was dropped from the scale in this study because it was deemed to be not culturally appropriate in the Swiss context. Respondents were also asked a series of demographic questions including age, level of education, and where they live.

Participants were also asked whether they seek nearby green areas to engage in any of a list of possible activities that could be undertaken in such areas. The list of activities included spending time with children, nordic walking, cycling, walking, dog walking, jogging, doing nothing, reading, picnicking, ball games, and passive games.

Results

Analysis was carried out using SPSS version 16.0.1. The 'psychosocial outcomes scale was found to be of an acceptable internal consistency by returning a Cronbach's alpha of 0.87. Another means of assessing internal consistency is via principal component analysis (Dunlap et al. 2000) and an unrotated principal component analysis found that all 15 items loaded against the first factor, which explained 36.2% of the variance.

To test the dimensionality of the scale a principal component analysis with varimax rotation was carried out with the results shown in table 1. Principal component analysis was selected so that results could be reasonably compared with the results of Shin et al.'s (2005) study.

Item	Outcome	Item wording: I look for natural places near to where I live….	1* (23.5)	2* (17.6)	3* (14.5)	Mean	S/D
12	Helping others	to be of assistance to others.	.836			2.73	1.20
13	Affiliation	to socialise with others.	.836			2.84	1.28
14	Self-enhancement	to use and develop my talents.	.762			2.94	1.26
15	Solitude	to do things alone without feeling threatened.	.684			2.83	1.38
8	Family bonding	to experience family togetherness.	.546			3.44	1.23
4	Natural scenery	to experience natural beauty.		.792		4.72	0.58
7	Learning nature	to learn something about nature.	.353	.699		3.97	1.09
9	Sensitivity	for stimulation of my senses.	.350	.636		3.91	1.14
10	Compensation	to experience something new, fresh or unusual.	.522	.530		3.43	1.22
3	Exercise	for physical exercise.		.485		4.12	1.12
6	Pleasure seeking	to experience fun outdoors.		.394		4.37	0.92
2	Escape challenge	to escape from routine life.			.845	3.95	1.17
5	Escape duty	to escape from work pressure			.778	3.76	1.26
1	Tranquillity	to experience peace or calm.		.368	.649	4.50	0.85
11	Introspection	to think about myself.	.402	.326	.444	3.78	1.21

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
* The number in brackets represents the percentage of variance explained by this component

The psychosocial outcomes scale was regressed against each of the activities. The results are shown in Table 2.

Activities

Activity (% Participation)	P value	Exp(B)	Odds	Motivation variable
Time with children (43.5)	0.000	1.90	⇑	to experience family togetherness.
	0.042	0.83	⇓	to experience something new, fresh or unusual.
	0.040	0.81	⇓	to be of assistance to others.
Nordic walking (13.5)	0.000	1.76	⇑	for physical exercise.
	0.027	1.38	⇑	to experience fun outdoors.
	0.022	1.30	⇑	to socialise with others.
	0.041	0.81	⇓	to escape from work pressure.
Cycling (35.3)	0.000	1.53	⇑	for physical exercise.
	0.003	1.33	⇑	to experience fun outdoors.
	0.028	0.85	⇓	to do things alone without feeling threatened.
Walking (79.4)	0.006	1.56	⇑	to experience natural beauty.
	0.018	1.31	⇑	to experience peace or calm.
	0.013	1.22	⇑	for physical exercise.
	0.013	0.77	⇓	to experience something new, fresh or unusual.
Dog walking (20.2)	0.015	1.33	⇑	to be of assistance to others.
	0.004	0.78	⇓	to experience family togetherness.
	0.007	0.75	⇓	to socialise with others.
Jogging (18.6)	0.000	1.98	⇑	for physical exercise.
	0.001	1.41	⇑	to think about myself.
	0.011	1.37	⇑	to experience fun outdoors.
	0.029	0.78	⇓	to learn something about nature.
Doing nothing (41.5)	0.021	1.30	⇑	to experience peace or calm.
	0.001	1.30	⇑	to think about myself.
	0.004	0.82	⇓	for physical exercise.
Reading (46.8)	0.017	1.23	⇑	for stimulation of my senses.
	0.008	1.20	⇑	to do things alone without feeling threatened.
	0.025	0.85	⇓	for physical exercise.
	0.021	0.82	⇓	to experience fun outdoors.
Picnicking (35.9)	0.004	1.43	⇑	to experience peace or calm.
	0.000	1.43	⇑	to experience fun outdoors.
	0.000	1.30	⇑	to experience family togetherness.
	0.009	1.24	⇑	to think about myself.
	0.024	0.80	⇓	to be of assistance to others.

The activities column denotes the activity and the proportion of respondents who actively seek nearby natural areas in which to engage in the activity. In the 'odds' column, '⇑' indicates an Exp (B) greater than 1, which signifies that, the more likely a person is seek a nearby natural area to engage in the activity, the MORE likely they are to be motivated by the corresponding item to do so. Alternatively, '⇓' indicates an Exp (B) less than 1, which signifies that, the more likely a person is seek a nearby natural area to engage in the activity, the LESS likely they are to be motivated by the corresponding item to do so.

Regressing the responses to the psychosocial outcomes scale against the demographic variables found that

- Where the respondent lived on the urban/rural gradient was a significant predictor of item 10 (*to experience something new, fresh or unusual*, p=0.015, Beta = .114),
- Level of education was a significant predictor of items 7 (to learn something about nature, p=0.03, Beta = 0.101) and 13 (*to socialise with others,* p=0.006, Beta = 0.145)
- Age of respondents was a significant predictor of items 2 (*to escape from routine life*, p=0.002, Beta=-0.127), 5 (*to escape from work pressure,* p=0.000, Beta=-0.198), 6 (*to experience fun outdoors*, p=0.000, Beta=-0.153), 7 (*to learn something about nature*, p=0.000, Beta=0.213), 8 (*to experience family togetherness*, p=0.028, Beta=-0.081), 11 (*to think about myself,* p=0.000, Beta=-0.176), 12 (*to be of assistance to others*, p=0.001, Beta=0.155), 13 (*to socialise with others*, p=0.003, Beta=0.138), and 15 (*to do things alone without feeling threatened*, p=0.001, Beta=0.131).

Discussion

The **motivational factors** for visiting nearby green spaces can be determined by examining the results of the principal components analysis. The *Helping others*, *Affiliation*, *Self-enhancement*, *Solitude* and *Family bonding* items loaded against this first component, which can be labelled "self/other relations". This result is reasonably consistent with Shin et al's, (2005) "learning and self/other relations" component although the *Learning nature* item did not load against this component in this analysis. It should be noted however, that the items forming this factor were rejected as motivations for going to natural places nearby to where the respondent lives. Although this factor explains the variance most (23.5%), it is the least important motivation for visiting green spaces, and was the component with the lowest means in both this study and in that of Shin et al. (2005).

The increased bonding between neighbours identified by (Kuo et al. 1998) required urban green spaces that are well used and the results of this study support those of Coley et al. (1997) that it is the natural elements that promote increased use. Interaction between residents and the consequent societal benefits (Kuo et al., 1998; Kuo and Sullivan, 2001) appear to be desirable by products of the increased use rather than a general motivation for visiting green spaces. In light of this finding, Sullivan et al.'s (2004: 698) goal "to have nature at every doorstep" appears to be a reasonable proposition.

The second component revealed in this study can be labelled "being stimulated by nature" and shares a degree of overlap with Shin et al's, (2005) third factor ''enjoying nature''. The factors (*Natural scenery, Learning nature, Sensitivity, Compensation, Exercise*, and *Pleasure seeking*) loaded against this component although the *Escape challenge* item, which Shin et al. included in their 'enjoying nature' factor did not. While this study supports the concept of an 'enjoying nature' component, it is not clear how Shin et al. (2005) reached this conclusion with their third factor, in which the *Tranquillity, Escape challenge,* and *Natural scenery* items loaded against the third component. The *Natural scenery* Item seems to fit with the construct 'enjoying nature', although the *Tranquillity* and *Escape challenge* items could be interpreted as belonging to a different construct. This 'being stimulated by nature' component appears to be the most important grouping of motivations with the highest mean responses, and is compatible with Kaplan and Kaplan's (1989) 'fascination' dimension of attention restoration.

This suggests that the restorative benefits of nearby natural areas are the main motivation for visiting them and supports the notion that restoration can take place in the smaller scale urban green spaces. This result suggests that people actively seek the natural environments that Ulrich, (1983) Ulrich et al. (1991) Staats et al. (2003) and van den Berg et al. (2003)

found to be more restorative than urban environments. Furthermore, since learning about nature is included in the fascination component it underlines the relationship between self-actualisation and restoration.

The Tranquillity, Escape challenge, Escape duty, and Introspection items loaded against third component identified in this analysis, which can be labelled 'escaping' and is the component containing the items with the second highest mean ratings. This 'escape' component is reminiscent of Kaplan & Kaplan's (1989) 'being away' dimension of attention restoration and is in agreement with Hartig & Staats, (2003) benefits of urban ecosystems as the restorative contrast to the built environment that urban nature provides. The key is contrast, which is inherent in the term escape since there is an implication of 'escape to' and not just 'escape from', which is supported by the inclusion of the experience of tranquillity and opportunity for introspection. These pull factors in the escape component further underline the relationship between self-actualisation and restoration.

The **motivations** for undertaking particular activities can be determined by examination of the results presented in Table 2. What is especially interesting in this result is that, although each activity is undertaken in a nearby natural area to provide psychosocial outcomes, it appears that the activities undertaken are expected to satisfy more than one need. For example, people who choose a nearby natural area to engage in walking are motivated to do so *to experience natural beauty*, which belongs to the component 'being inspired by nature'. Yet, at the same time, they are also motivated to do so *to experience peace or calm*, which belongs to the component 'escape'. Another example is that people who choose a nearby natural area to engage in reading are motivated to do so *for stimulation of their senses*, which belongs to the component 'being inspired by nature'. Yet, at the same time, they are also motivated to do so *to do things alone without feeling threatened*, which belongs to the component 'self/other relations'. The wish to satisfy more than one psychosocial outcome was found to be the motivation for each of the activities, with the exceptions of 'dog-walking' and 'doing nothing'.

Activities chosen to achieve a particular psychosocial outcome also show some consistencies but also considerable variability. People motivated to visit nearby natural areas *for physical exercise* are understandably likely to choose an energetic activity such as jogging, cycling, or Nordic walking. Furthermore, people who are motivated to visit nearby natural areas *for physical exercise* are also motivated by the wish *to experience fun outdoors* and seek a nearby natural area to engage in an energetic activity to do so. However, a person motivated to visit a nearby natural area by the desire to self-reflect, indicated by the item *to think about myself*, is more likely to engage in the passive activity of doing nothing, the social activity of picnicking, or the energetic activity of jogging. Interestingly, the desire to

'escape', although an important psychosocial outcome, did not appear to be attached to any particular activity.

Respondents who had attained a higher **education level** were more likely to be motivated by the desire to *learn something about nature* and to *socialise with others* than people with lower education levels. This result is in contrast to the findings of Shin et al. (2005), who found that all of the outcome factors showed significant differences between visitors who had attained different levels of education and Yilmaz et al. (2005), who found that education level was not a significant predictor of park use. Given the methodological similarities between this study and that of Shin et al. (2005), we can conclude that the differences are cultural.

Regressing the responses of the psychosocial outcomes scale against where the respondent lives on the **urban/rural gradient** revealed that there was no significant relationship between any of the variables and where a respondent lives on the country-city gradient. People are motivated by the desire to achieve essentially the same psychosocial outcomes from contact with nearby nature, regardless of whether they live inside or outside a city. This has implications about the degree of wildness required, since those living further from the cities could be expected to have wilder places nearby. That no differences could be found suggests that it is the relative contrast that is the characteristic of the place that is escaped to rather than a quantitative set of characteristics that provides the psychosocial outcomes. The exception is the item '*to experience something fresh or unusual'*, which suggests that people who live in urban areas are marginally more likely to be motivated by the idea of experiencing something new than people who live in the country. This makes intuitive sense since people who live in the country are likely to have a greater degree of contact, and consequent familiarity, with natural areas than those who live in the cities.

Shin et al. (2005) found **Age** to be a significant predictor of responses to the psychosocial outcomes scale and stated that older visitors to urban forests were more likely to rate the outcomes as important than those who were younger. Similarly, the results of Payne et al. (2002) and Yilmaz et al. (2005) suggested that age plays a significant role in use of parks. The significance of age has been supported by this study, however it was found that older people are more likely than younger people to be motivated to visit a nearby green space by the desire to *learn something about nature*, *be of assistance to others*, *socialise with others*, and *do things alone without feeling threatened items*. However, older people are less likely than younger people to be motivated to visit a nearby green space by the desire to *escape from routine life, escape from work pressure, experience fun outdoors, experience family togetherness, and to think about themselves.* The pattern can be observed that older people tend to be motivated by the wish to seek social contact while younger people tend to seek restoration.

In **conclusion,** we consider Kaltenborn & Bjerke's (2002, p.3) comment that 'expanding the perspective from considerations of the functional capabilities of the landscape to values and socio-cultural meanings is probably one of the paramount challenges of future land use planning'. Understanding the psychosocial outcomes that motivate people to visit nearby green spaces is a step towards meeting that challenge. It appears that urban spaces can provide the services of restoration, social bonding, and self-actualisation that are often ascribed to wilderness. Furthermore, Hernandez and Hidalgo (2005), and Peron et al.'s (2002) finding that restorative benefits can also be obtained in the urban mixed environments have been supported by this study.

This study has identified three categories of outcomes, namely stimulation by nature, escape, and self/other relations that summarise the outcomes that motivate people to visit nearby green spaces. Managers of green spaces, particularly in urban areas, would be well advised take these desired outcomes of users into consideration. To complicate matters further, this study has also shown that people select activities with the aim of achieving multiple outcomes simultaneously. For example, the knowledge that energetic activities are expected to satisfy a need for physical exercise and provide fun outdoors, yet at the same time, are expected to satisfy the need to socialise, in the case of Nordic walking, and the need to self-reflect, in the case of jogging provides a difficult challenge.

However, this study has also shown that there can be no universal recipe and that the demographics of the target population should be a design consideration. Older people tend to be motivated by the wish to seek social contact while younger people tend to seek restoration. It will be the challenge of future research to determine which landscape elements provide the optimum characteristics for satisfying the desired psychosocial outcomes. This study has however, shown that people are motivated to visit nearby natural areas by the desire to achieve specific psychosocial outcomes. Furthermore it has underlined the importance of nearby natural areas because of the services they provide to the individual, and also for the benefits to society that stem from visitation.

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Chapter 6

Selection Criteria for Species as Representatives of Conservation Organizations

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Abstract

A major challenge facing humanity is to achieve a significant reduction of biodiversity loss and much of the work that is carried out to preserve biodiversity is carried out by non-governmental conservation organizations. Public support enhances the ability of conservation organizations to function, and enhances the chances of conservation project success, by providing revenue and by increasing acceptance of interventions and/or public engagement. The use of charismatic species as flagships is among the key tools used by conservation organizations to motivate public support, however representative species are reported to be often selected in an *ad hoc*, rather than systematic, manner. Furthermore, little is known about whether these representative species are able to achieve the motivational tasks assigned to them. This paper describes a study carried out in Switzerland in which representatives of international, regional, and local conservation organizations were interviewed (N=16) and the selection criteria of their flagship species were analysed. Using the isolated criteria, a charismatic species (Great Spotted Woodpecker) was selected as a potential representative species and an apparently less charismatic species (Clover Stem Weevil) was selected as a species featuring none of the desirable characteristics. A treatment/control experiment was then undertaken (N=900) using conjoint analysis to measure whether the likelihood of attracting the selected species influences preferences for urban landscapes that include habitat variables. It was found that flagship species do have the ability to influence public attitudes towards habitat variables, with the clear implication that this can be translated to influencing acceptance of conservation interventions. Furthermore it was found that an uncharismatic species can adopt the role of a flagship species in specific contexts and positively influence attitudes towards habitat variables that encourage biodiversity. These results may be used by conservation organizations to assist in the selection of flagships, and in particular for flagship species that are intended to perform a specific conservation function. To achieve ecological goals, the species chosen as a motivation should be selected specifically for the particular goal and with consideration of the local context.

Introduction

Halting the loss of biodiversity has become an urgent issue facing humanity and governments of 191 countries have committed, in the Convention on Biological Diversity, to achieving a significant reduction of the current rate, as of 2002, of biodiversity loss by 2010 (SCBD, 2008). However, much of the work that is carried out to preserve biodiversity is carried out by non-governmental conservation organizations. Hunter & Rinner (2004) argue that academic researchers, conservation activists, local policy makers, and land managers should be particularly interested in the public environmental perspectives when designing strategies and interventions to enhance species conservation. Ecological strategies are reasonably fixed in that a particular action will preserve a particular species or habitat. However, in many cases, the success of a strategy is dependent on the acceptance by the public who are expected to either finance the strategy or otherwise tolerate the restrictions that are inevitably associated with conservation interventions. Acceptance will increase when, as Kaplan et al. (1998) have suggested, natural areas are designed and managed in ways that are beneficial for people and appreciated by them.

It was stated in the Erfurt Declaration (Müller et al., 2008) that 'the battle for life on Earth will be lost or won in cities'. By this, it is meant not only that cities themselves provide havens of biodiversity but also that decisions affecting biodiversity in the countryside are made in cities. Cities are understandably then focal points of lobbying and fundraising efforts by the conservation organizations to motivate support for conserving and enhancing the environment in general, and for preserving individual species. For conservation organizations to function, they require public support to increase visibility and awareness, to inspire membership and/or public engagement, and to provide revenue. This in turn enhances the chances of conservation project success by allowing resources to be allocated and by increasing acceptance of interventions.

Representative species are used, via a variety of use strategies, as an efficient way of raising awareness and motivating public support by organizations that are interested in environmental issues. They can be offered as an indicator to measure the effects of mankind on the environment, as an indicator of population changes in other species, as a symbolic flagship species in the socio political context to awaken the interest of the public, as an umbrella species so that its protection simultaneously protects other species, or to identify areas of high biodiversity (Caro & O'Doherty, 1999). This paper describes a study carried out in Switzerland in 2008 with the aims of determining by which criteria conservation organizations select representative species to motivate support and whether representative species have the potential to change public opinion. To address these aims, qualitative interviews with spokespersons of conservation organizations in Switzerland were carried out and the common selection criteria of their representative species established. A species was

selected according to these criteria and a treatment control experiment with a random sample of the general public was used to measure whether such a species does indeed have the ability to influence public opinion.

CHARACTERISTICS OF REPRESENTATIVE SPECIES

Andelman & Fagan (2000) criticise the often *ad hoc* selection of representative species, which often occurs without prior investigation and with implicit rather than explicit underlying assumptions. They concluded that the current understanding of the overlap model between individual species is not an appropriate method of selection of representative species. Favreau et al. (2006), after reviewing 53 studies, reached the conclusion that there are virtually no generally valid rules about the effectiveness of the concept of representative species. Their results show that the applications with the most efficient results, originate from a combination of concepts. Simberloff (1998) points out that single-species management, such as through umbrella species, while inherently attractive, may ignore ecosystem management and proposes a combination of management philosophies based on the concept of keystone species.

Umbrella and keystone species

Eisenberg (1980) and East (1981) developed the concept of umbrella species without explicitly using the term, which was first used by Frankel & Soulé (1981) to describe a species for which measures for its protection can also 'lend' protection to other species. The theoretical background of the concept is that an umbrella species requires a large and relatively natural habitat area for a viable population to survive. If that area is protected, other species that live within the protected habitat range will also be protected (Peterson, 1988; Meffe & Carroll, 1997; Samways et al., 1995). However the umbrella species concept was the subject of an increasingly critical evaluation in the 1990s (e.g. Launer & Murphy 1994; Berger 1997; Simberloff, 1998). Caro & O'Doherty (1999) contrasted the umbrella species concept with the concept of indicator species and pointed out that the size of the necessary habitat range is the crucial characteristic rather than the condition of the umbrella species population.

Keystone species on the other hand are defined not by their range, but by their influence on the population density of other species and the consequent influence on the species balance of an ecosystem. The term, originally used by Paine (1969), uses the analogy of a keystone in an arch. If the keystone is removed, the arch collapses and if the keystone species is removed, the ecosystem collapses. Simberloff's (1998) definition is that a keystone species is a species that has a far greater influence on many others species than would be expected from its contribution to the biomass or its abundance. Chapin et al.'s (1995: 290) definition is similar although they state that any means of influence give keystone status, and thereby

challenge the assumption that a keystone species must be a visible species that exists on a high trophic level. They further comment that keystone species are usually only discovered once they are absent from the ecosystem. Umbrella and keystone species however, encompass purely ecological functions (Caro & O'Doherty, 1999: 806) while indicator species can encompass ecological and/or strategic functions depending on how they are used, and whether they are selected to show species structure or environmental change.

Indicator species

Indicator species are organisms whose condition, such as presence, population density, range, or reproductive success, can be used to infer the condition of other species, systems, or environments that would otherwise be too difficult, impractical, or expensive to measure (Landres et al., 1988; Carignan & Villard, 2002). Simberloff (1998: 248) takes a more dynamic view and sees indicator species as species from which the presence or fluctuations of other species and/or chemical or physical changes in the environment can be inferred by their own presence or fluctuations. Meffe & Carroll (1997) similarly view indicator species as indicators of change and suggest the use of species that are sensitive to change as early warnings for environmental change, such as habitat fragmentation, pollution, or other stress factors. These definitions as indicators of change and/or condition lend themselves to division into more specific categories of indicators. Three examples are bio-indicators, population indicators, and biodiversity indicators.

Bio-indicator species are sensitive to, and can therefore reflect, the quality and changes in the environmental conditions. Changes in the distribution, abundance, and demographic characteristics of species groups such as amphibians, birds, fungus, or coral can be indicators of threatening changes to ecosystems (Samways et al., 1995; Nagel, 1999). Population indicator species are those from which population changes in other species can be inferred. Ideal characteristics of population indicators are that they should not be a wandering species, should be easily observable, have a rapid reproduction rate, and occupy a specific trophic niche (Caro & O'Doherty, 1999). Beccaloni & Gaston (1995) state that the presence or condition of a biodiversity indicator species reflects the biodiversity of the habitat in which the biodiversity indicator is found. In their study of butterflies, they concluded that the number of species of one butterfly type was an effective indicator of the total butterfly diversity in an area (Beccaloni & Gaston, 1995). Once a biodiversity indicator species has been identified, the biodiversity of the ecosystem can be assessed by observing that particular species, rather than by undertaking a potentially difficult and costly overall biodiversity assessment. The connection between indicator species and public support for environmental interventions is often based on the assumption that the public holds an altruistic worldview in which nature is inherently valued. However, a more anthropocentric approach is often taken to allow for the case that a particular public does not inherently value

nature. It can be argued that an indicator species must have the charismatic characteristics of a flagship species if it is to be effective in a strategic function.

Flagship species

Samways et al. (1995: 491) define flagship species as 'known charismatic species that serve as a symbol or focus point to raise environmental consciousness'. Nentwig et al. (2004) write that flagship species are particularly important for nature protection due to their high prestige and publicity value, and consequent suitability in encouraging the implementation of political measures. These species are often loaded with emotion and conflict, and are easily and effectively used in promotion of a conservation agenda (Nentwig et al., 2004). Charismatic large vertebrates, which are visible dominant elements of our natural environments, provide the best vehicles for the strategic function of raising awareness of environmental themes in the general public. They awaken more sympathy than for example plants or insects, attract more financial support, and therefore serve to invoke protection of other species' habitats under the umbrella of their own high habitat demands (Meffe & Carroll, 1997). Lambeck (1997) also builds upon the umbrella species concept and, using the term focal species as a synonym of flagship species, suggests that well selected focal species can provide a safety net for other species.

However, Walpole & Leader-Williams (2002) state that, while some flagship species can simultaneously serve as umbrella species, an ecological function is not necessary. It is sufficient for them to be merely charismatic and loved. They point out that their socio-economic function, rather than ecological function, does not place them in competition with ecological goals but rather enhances them (Walpole & Leader-Williams, 2002: 543). While flagship species have less clear classification criteria (Leader-Williams & Dublin 2000), they have a purely strategic function and are therefore the category most relevant to nature protection organizations. Many nature protection organizations use flagship species in some way.

ROLE OF FLAGSHIP SPECIES

A common use of flagship species by conservation organizations is as a logo. In many cases, the species do not represent a specific conservation goal but are symbolic of the organization as a whole, while in others, the species is selected to represent a goal and the protection of that species is a central and unifying focus of the organization. Pictures are often used as an efficient way of achieving an emotional connection, since pictures are able to transmit complex messages in a simple and powerful way. Pictures are also free from intellectual barriers since everybody can interpret pictures, even when they cannot read or when they speak a different language (Kroeber-Riel, 1993).

Charismatic species are understandably selected for logos and are particularly useful in providing a focus for fundraising and advertising efforts. The effectiveness of a flagship species is enhanced if the connection between species and the human population can be established, or if a relationship exists and the species already belongs in the people's sense of place with an inherent right of existence. The loss of the species would then affect the people more than the loss of habitat, even when the loss of habitat is the very threat to the species (Entwistle et al., 2000). More money can often be generated for nature protection projects through the use of flagship species than can be generated using, for example, complex ecological concepts (Leader-Willliams & Dublin, 2000). Public perceptions of a species' charisma can be as important as its rarity or the degree of endangeredness, when assessing the relative economic value of a particular species (White et al., 1997).

This focus on species protection brings two advantages to conservation organizations. Firstly it is easier to present the organization as a specialised and coherent organization. Secondly it creates fewer mental barriers when carrying out fundraising activities. The attention is focussed on a single species rather than connected to a vague and difficult to understand concept such as biodiversity or genetic variation. Donors can then attach their support to a tangible subject that gives substance to the conservation concept. Leader-Willliams & Dublin (2000) conclude that the more simple the message, the higher the willingness to donate. Furthermore, flagship species are used extensively in promotion of eco-tourism, which has flow on benefits for conservation organizations, since the profiles of projects to protect the species are raised (Sergio et al., 2006). Flagship species can however be difficult to identify and their selection is inherently problematic.

Only a small number of species feature the characteristics required of a biodiversity indicator species, namely that it should be easily observable (or quantifiable), be widely geographically distributed within the habitat, and be specialised to that habitat type. A group of several species will often be most suitable, although a group of species will display a certain internal diversity (Caro & O'Doherty, 1999). There are many areas that do not feature a charismatic species that would be suitable as a flagship species, yet possess considerable species richness that is worthy of conservation (Simberloff, 1998). Biodiversity hotspots are often without a suitable flagship species and can be forgotten if charismatic species elsewhere receive the entire focus of attention (Linnell et al., 2000). There is a danger that concentration on few emotion invoking species, such as large and charismatic endangered endemic species, can divert financial resources away from projects that are designed to protect less charismatic species, which may be equally worthy of protection (Entwistle & Stephenson, 2000).

The use of flagship species can lead to conservation concepts that are based on emotion rather than science. A species must display a high probability of existing in a stable population if its protection is to serve as a conservation measure for other species. Endangered species, and thereby many potential flagship species, do not possess this characteristic (Berger, 1997). Campaigns are often based on the charisma or popularity of a species rather than on scientific or objective principles (Entwistle & Stephenson, 2000). Entwistle & Dunstone (2000) point out that the collection of donations for the broad protection of biodiversity through concentration on a single flagship species can negatively affect the credibility of an organization, when it is not clear to the donors how the money will be spent. *In Situ* programs for the protection of these species are often carried out which are exclusively of benefit to the flagship species, and can even be to the detriment of other species (Simberloff, 1998). The attractiveness of a species then becomes a replacement for, rather than an instrument of, nature conservation (Konteleon & Swanson, 2003).

Furthermore, the protection of flagship species can transmit an unrealistic perspective of nature protection. Little evidence exists that any species can serve as an indicator for population fluctuations in another species. Population fluctuations can be caused by a variety of factors that are not directly related to habitat quality, such as weather, predators, and diseases, so it is likely that population fluctuations may not be the same among different species (Landres et al., 1988). Caro et al. (2004) question whether any species can represent the majority of biodiversity because virtually all species in an ecosystem have specific habitat demands. In reality, solutions are often sought for problems that have little to do with the target species or their habitats (Entwistle et al., 2000). Bonn et al. (2002) investigated how well habitats of endangered or endemic birds also provide habitats for other bird species and found that, while such habitats often display a greater species richness than randomly selected areas, many species are underrepresented. This result suggests that endemic or endangered species often tend towards very specific habitat niches and resources allocated to protection of these niches may not automatically contribute to broader conservation goals.

Criticism of the flagship species concept however, tends to be based on the assumption that a flagship species must either have ecological value or be endangered, and to concentrate on the ecological arguments that flagship species are used to represent. However, the strategic purpose of flagship species remains as primarily a means of attracting public support for conservation projects or organizations and is not explicitly dependent on the ecological principles behind them. Flagship species continue to be widely used by conservation organizations; yet an underlying theory explaining their use has rarely been the subject of study or discussed in academic literature.

Research gap

Most discussion until now has been on the case study level and describes the effectiveness or otherwise of the use of flagship species in specific conservation projects while, on a general level, the selection methods of flagship species have been neglected. A flagship species, according to accepted definition, must be charismatic if it is to achieve conservation goals. However charismatic is an inherently subjective term and to our knowledge, no study has been carried out into the real-world selection method of charismatic flagship species. Furthermore it is not known whether charisma is a fixed attribute of a particular species in a particular culture, or whether charisma can be allocated to a species with the provision of information. To address these knowledge gaps, the following research questions were formulated.

1. How do conservation organizations choose a flagship species and what are the selection criteria?
2. Can the use of a flagship species influence attitudes towards habitats?
3. Can the use of non-charismatic species influence attitudes towards habitats?

METHOD

The research questions were addressed in distinct qualitative and quantitative phases. To address research question 1, we decided to directly approach conservation organizations that are actively working in Switzerland. A qualitative method was selected because firstly, such a method allows deeper insight while avoiding the risk of introducing irrelevant constructs and secondly, such a method is practicable given the small number of active organizations. Representatives of international, regional, and local conservation organizations were interviewed (N=16) and the criteria for selection of their representative species analysed. The interviews were content analysed at the meta level with a concentration on constructs, which are common across organizations, and constructs, which are applicable to particular organizational contexts, such as whether the organization operates on a local or international level.

To address questions 2, and 3, a quantitative experiment was undertaken in which all respondents were asked to rate an identical series of scenarios. Two groups were treated with information about either a charismatic species or a supposedly less charismatic species while a control group was given no additional information. A comparison of the ratings of the various scenarios given by those from each of the three groups allowed conclusions as to the effects of the treatments.

Participants in the quantitative study were shown photomontages of urban semi private spaces in which varying levels of habitat quality, expressed by vegetational and structural complexity (4 levels) and varying levels of infrastructure (3 levels), had been added.

Information about the costs of the various landscaping options was also given as an additional attribute (4 levels). Participants were randomly allocated to three groups and asked to rate the landscapes on a likert scale of one to ten. One third of the respondents were informed of a correlation between environmental complexity, a well functioning ecosystem and the probability of attracting the charismatic Great Spotted Woodpecker (*Dendrocopos major*) to the site, while one third of the respondents were informed of the probability of attracting the less charismatic Clover Stem Weevil (*Ischnopterapion virens*) to the site. The woodpecker species was selected because it possesses the desirable characteristics of a flagship species and, although it is not considered to be endangered, sightings are uncommon. The clover stem weevil features none of the desirable characteristics of a flagship species.

The most preferred levels of each landscape attribute, as well as the relative importance of each attribute were calculated using SPSS conjoint, which uses the ordinary least-squares estimation method (SPSS, 1997). The full-concept approach for conjoint analysis was adopted in which the elements were added to the empty landscape in a fractional factorial design, with 16 scenarios. A Fractional factorial design was selected in which a fraction, selected to be an orthogonal array, of all possible alternatives was presented to respondents, because it was deemed that a full factorial design, with all 48 combinations of attributes, would be too time-consuming to complete and overly fatigue the respondents, thus potentially invalidating the responses. Examples of the stimulus scenarios are shown in Figure 1.

Habitat Quality – Best
Infrastructure – Path
Cost level – 2

Habitat Quality – Good
Infrastructure - All
Cost level - 3

'Empty' Landscape

Habitat Quality – worst
Infrastructure – Path
Cost level – 3

Habitat Quality – Poor
Infrastructure – None
Cost level – 4

Habitat Quality – Best
Infrastructure - All
Cost level - 1

Figure 1: Stimulus Photograph examples showing varying habitat quality, infrastructure, and associated additional costs.

Samples

The sample selected for the qualitative phase of this study consisted of 16 organizations that were operating in Switzerland and actively engaging in nature conservation on international (n=5), national (n=5) und regional (n=6) levels. Environmental protection organizations were primarily selected although some animal protection organizations were also included in the sample because of their targeted publicity. Since the focus of this study is on the use of representative species, organizations with one or more animal species in their logos were selected. The interview partners were self selected by the organizations and included the media contact persons, management committee members, and organization presidents. For reasons of preserving the anonymity of the participating organizations, neither their names, nor the names of the species on their logo will be given in this paper.

Since cities are often the focus of membership recruitment, fundraising, and awareness campaigns by conservation organizations, they are also the focus of this study. A random sample of households from three major Swiss cities, Lugano, Lucerne, and Zurich was used in a mail out survey in the quantitative phase and 2980 surveys were delivered. The response rate was 30.2% with 900 valid questionnaires returned. Lugano is located south of the Alps in the Italian-speaking region of Switzerland and is considered to have cultural differences in attitudes towards nature compared to Lucerne and Zurich, which are north of the Alps in the German-speaking region (Brechbuhl & Reh, 1998).

RESULTS

Research question 1: Selection of species by conservation organizations

The most important design criterion nominated by each organization was that the logo should capture the essence of the organization and thereby inspire the formation of an internal connection with the organization. Capturing the essence was related to the species selection, which was deemed to be more important than the graphical design. Understandably for

conservation organizations, the protection of rare and/or endangered species forms a significant part of their perceived essence, so consideration of ecological characteristics featured strongly in most of the nominated selection criteria. In four cases (two international, one national, and one regional), the logo species was the centre of a conservation or protection effort at the time that the organization was founded. In particular, organizations operating on the regional level selected species that are locally endangered, yet are associated with power and speed. In two of these cases, the selected species were higher order predators with specific habitat requirements. They were explicitly nominated as indicators of the general environmental condition while simultaneously serving an umbrella function in that preservation of their extensive habitats would maintain the habitats of many other species. Importantly, the interview partners from these organizations were aware of the umbrella species and indicator species concepts.

Symbolism associated with various species was also deemed to be a significant selection criterion, with characteristic associations including speed, strength, wisdom, and peace seen as desirable. This is independent of the actual characteristics of the species and is based entirely on popular perception. Similarly symbolism associated with particular species habitats, such as mountains, rivers, and air was a consideration in species selection. A further important criterion is the profile of the species. The species that were selected were already present in the consciousness of the people, and species that would require a program to introduce or explain it to the public were seen as undesirable. This is occasionally, but not always, a contradiction with the desirability if a species being rare or endangered. Known species within a region are desirable in that they can be seen and the effectiveness of conservation efforts observed by the public. One national organization had a symbolically powerful species selected as its logo, but the species had been exterminated from Switzerland some years before and furthermore it was considered to be dangerous and incompatible with humans. The failure of this logo to build connections with the public caused a new species to be selected, which was also powerful and also no longer present, but was not considered to be incompatible with people. The reintroduction of this new species served to add the symbolism of success with this organization and this flagship species has become a powerfully connecting species between the people and the organization.

The requirement for a species to be found throughout the range in which an organization operates is more difficult to fill on an international level, since there are few species with a worldwide range. International organizations therefore tended to seek species that have some special meaning for the organization, whether that be historic or to reflect the focus of an ongoing campaign. Given that an internationally appealing animal is unlikely to have widespread ecological significance, the selection criteria could be based solely on the charisma of the species. With this in mind, another important criterion is that of identifying the target public. If a species is intended to build connections with children, one with, or with the

potential for creation of, anthropomorphic characteristics should be chosen. Ecological aspects were weighted more strongly for adult target populations who are perceived to be better able to make abstract connections between a species and an environmental condition or change, such as the polar bear and climate change. Animals with anthropomorphic round heads and eyes, and creatures with characteristics that lend themselves to anthropomorphism are particularly appropriate because of people's ability to identify with them.

There was general agreement that species which have the potential to invoke negative emotions, such as reptiles or poisonous species should be avoided. However, it was the opinion of some organizations that species that are not perceived as charismatic or attractive can be used as flagship species for specific projects, depending on the goals of a particular organization or campaign, and on the target public. There was general agreement that endangered species have an increased public appeal so endangered species, such as the water spider (*Argyroneta aquatica*), are potential flagship species due to their status. In light of this, it could be argued that any species could be used as a flagship when it is the focal point of a conservation project. Generally however, creatures that capture the essence of an organization, possess some positive symbolism, and are credible in that they are found within the operating range of the organization are considered to be more charismatic and therefore suitable for use as flagship species. Whether species that are not especially charismatic have as much ability to influence public opinion as a charismatic species is the topic of the quantitative phase of the study in which research questions 2 and 3 are addressed.

Research Questions 2 and 3: Species influence on public opinion

The results of this quantitative analysis are primarily expressed in terms of utility estimates and some description of their interpretation is warranted. Utility (part-worth) estimates, which are analogous to regression coefficients, were derived for each factor level from the ratings of each attribute combination (scenario). A higher utility estimate reflects a higher preference for a particular attribute at a particular level than a lower estimate while negative utility estimates reflect a negative preference (rejection). The part-worth estimates are expressed on a common scale so the attributes can be compared by calculating the ranges (highest–lowest) of these estimates and dividing them by the sum of all the utility ranges to give its relative importance (SPSS, 1997). The mean utility scores of each attribute at each level and the relative importance of each attribute are presented for each of the target cities are presented in the table 1, which is divided into three sections according to sample location.

Table 1: **Mean utility estimates for each attribute and level for each treatment, including the attribute importance. The difference in utility estimate and attribute importance between the respective treatment groups and the control group is shown in the columns labelled 'effect'.**

Lugano		Treatment Group to which Respondents were Allocated				
Attribute Level		Control (1)	Weevil (2)	Effect (2-1)	Woodpecker (3)	Effect (3-1)
Infra structure	none	-0.391	-0.615	-0.224	-0.377	0.014
	path	-0.053	0.265	0.318	0.028	0.081
	all	0.444	0.350	-0.094	0.349	-0.095
% Importance		39.120	36.440	-2.680	34.120	-5.000
Habitat	worst	-0.188	0.493	0.681	0.221	0.409
	poor	-0.376	0.986	1.362	0.442	0.818
	good	-0.565	1.479	2.044	0.663	1.228
	best	-0.753	1.972	2.725	0.884	1.637
% Importance		39.542	42.264	2.722	40.856	1.314
Cost	10Fr	-0.184	-0.211	-0.027	-0.206	-0.022
	30Fr	-0.369	-0.423	-0.054	-0.411	-0.042
	50Fr	-0.553	-0.634	-0.081	-0.617	-0.064
	70Fr	-0.737	-0.846	-0.109	-0.822	-0.085
% Importance		21.339	21.296	-0.043	25.025	3.686

Lucerne		Treatment Group to which Respondents were Allocated				
Attribute Level		Control (1)	Weevil (2)	Effect (2-1)	Woodpecker (3)	Effect (3-1)
Infra structure	none	-0.495	-0.348	0.147	-0.439	0.056
	path	0.159	0.265	0.106	0.186	0.027
	all	0.336	0.083	-0.253	0.253	-0.083
% Importance		33.628	28.561	-5.067	25.772	-0.756
Habitat	worst	0.419	0.682	0.263	0.999	0.580
	poor	0.839	1.365	0.526	1.998	1.159
	good	1.258	2.047	0.789	2.998	1.740
	best	1.678	2.729	1.051	3.997	2.319
% Importance		35.068	43.744	8.658	51.697	16.629
Cost	10Fr	-0.409	-0.364	0.045	-0.351	0.058
	30Fr	-0.817	-0.728	0.089	-0.702	0.115
	50Fr	-1.226	-1.092	0.134	-1.052	0.174
	70Fr	-1.635	-1.456	0.179	-1.403	0.232
% Importance		31.304	27.695	-3.609	22.531	-8.773

Zurich		Treatment Group to which Respondents were Allocated				
Attribute Level		Control (1)	Weevil (2)	Effect (2-1)	Woodpecker (3)	Effect (3-1)
Infra structure	none	-0.343	-0.364	-0.021	-0.364	-0.021
	path	0.129	0.112	-0.017	0.179	0.050
	all	0.214	0.253	0.039	0.185	-0.029
% Importance		31.039	28.945	-2.094	26.255	-4.784
Habitat	worst	0.486	0.582	0.096	0.973	0.487
	poor	0.971	1.164	0.193	1.945	0.974
	good	1.457	1.745	0.288	2.918	1.461
	best	1.943	2.327	0.384	3.890	1.947
% Importance		42.828	45.964	3.136	51.515	8.687
Cost	10Fr	-0.410	-0.346	0.064	-0.279	0.131
	30Fr	-0.819	-0.692	0.127	-0.557	0.262
	50Fr	-1.229	-1.038	0.191	-0.836	0.393
	70Fr	-1.638	-1.384	0.254	-1.115	0.523
% Importance		26.133	25.091	-1.042	22.229	-3.904

The utility estimates for infrastructure costs and variables were found to be similar across the three samples. The expected negative linear correlation between utility estimates and cost was found in each sample and adds confidence that the respondents considered all of the randomly assigned attributes when making their assessments.

In answering research question 2, evidence was found from each sample city that a respondent who is informed that a particular course of action will provide a habitat for a great spotted woodpecker will tend to favour that course of action over actions that are less favourable for the species. Increased likelihood of attracting woodpeckers resulted in a corresponding increase in utility estimate. For example, the utility estimate of the 'best' habitat increased by 2.319 in Lucerne, by 1.947 in Zurich, and by 1.637 in Lugano, when comparing the woodpecker treatment group with the control group. Furthermore, the importance of the habitat variable was greater for the woodpecker treatment group than for the control group in the samples from Lucerne (8.7%) and Zurich (16.7%). As could be expected, willingness to pay decreased with rises in costs, yet the woodpecker treatment groups from both Lucerne and Zurich rejected extra costs less strongly. The differences in utility estimates for the cost variable between the woodpecker treatment group and the control groups in Lugano were negligible.

Similar results were found in response to research question 3, in that the presence of the clover stem weevil also increased utility estimates for the habitat variable in each of the samples. Increased likelihood of attracting weevils resulted in a corresponding increase in

utility estimate. For example, the utility estimate of the 'best' habitat increased by 1.051 in Lucerne, by 0.384 in Zurich, and by 2.725 in Lugano, when comparing the weevil treatment group with the control group. This result is surprising in that the effect of the weevil in Lugano was considerably greater than that caused by the woodpecker. The weevil treatment groups from both Lucerne and Zurich rejected extra costs less strongly than the respective control groups while the Lugano sample showed no notable differences in the cost variable between weevil and control groups. Negligible differences in utility estimates for infrastructure variables were found between weevil treatment and control groups in Lucerne and Zurich, while respondents from Lugano displayed a slightly higher preference for landscapes with paths when informed of the presence of the weevil.

DISCUSSION

The mix of methods was found to be an informative approach to addressing the research questions, with the qualitative phase ensuring that the treatment variables used in the quantitative phase had real world relevance. However, with the knowledge of the decision criteria for selection of representative species, it proved difficult to identify a species featuring all of the desirable characteristics, which Simberloff (1998), Caro & Doherty (1999), and Caro (2004) suggested might be the case. The great spotted woodpecker was selected as the experimental flagship in the absence of a more suitable candidate. A non-charismatic species, with the clover stem weevil featuring none of the characteristics nominated during the qualitative phase of the study, proved easier to find. Respondents in the woodpecker and weevil treatment groups were informed that their respective species is an indicator species, so no conclusions can be drawn as to whether the ecological function, the charisma of the species, or a combination of both is the driver of any effects. Similarly no conclusions can be drawn as to whether ecological function contributes to charisma and further research is required to answer these questions.

In answer to research question 1, conservation organizations in Switzerland were found to be reasonably systematic in their choices of flagship and tended to select species in accordance with existing theory. Andelman & Fagan's (2000) criticism of the often *ad hoc* selection of representative species was directed towards the ecological use of representative species and appears not to apply to the selection of species that that are used to represent an organization. Although the organizations, particularly on the local level, may not be informed of the academic theory, their inherent contact with the public in the areas in which they operate gives them knowledge from which selection of representative species can be based. However, some organizations showed themselves to be explicitly aware of theoretical selection criteria and all of the organizations interviewed use principles consistent with marketing theory in selecting species that may cause a connection between people and creature.

Meffe & Carroll's (1997) suggestion that charismatic large vertebrates should ideally be selected as sympathy attracting flagship species appears to be widely accepted by conservation organizations although a degree of pragmatism was evident in that the organizations pointed out that conditions are not always ideal, and that sometimes less charismatic species should be chosen for particular projects, particularly on a regional or local scale. Despite Walpole & Leader-Williams' (2002) suggestion that flagship species need not fulfil an ecological function in addition to possessing charisma, there was a universal requirement that the species capture the essence of the organization. Conservation organizations, especially at the regional and national levels, often include preservation of endangered species and/or preservation of habitats among their core competences, so suggestions by researchers, such as Berger (1997) and Simberloff (1998), that a flagship species should ideally fulfil an ecological function appear to be adopted in real world applications. An implication of ecological function is that the range of the species should allow it to fulfil that function (Caro & O'Doherty, 1999) which, if the species is to be relevant to the organization, suggests that it should be found throughout the area where the organization operates. However, ecological function and the consideration of less charismatic species were found to be less evident in organizations that operate internationally who would agree with Walpole & Leader-Williams (2002) that ecological function is less important than charisma.

In addressing research question 2, it was necessary to select a suitable flagship species according to the selection criteria provided by the qualitative phase and it appears that the woodpecker provides Leader-Williams & Dublin's (2000) tangible subject and simple message in the area of this study. Symbolism associated with various species was found to be significant selection criterion and woodpeckers were considered to exemplify compatibility with humans and to be therefore desirable. A further important criterion identified during qualitative interviews is that the species should enjoy a high profile and the woodpecker is well known in its natural habitat range. Although woodpeckers do not immediately seem to carry anthropomorphic characteristics, the creation of the cartoon character 'woody woodpecker', shows that its characteristics lend themselves to anthropomorphism which was an attribute that organizations claimed contributed to charisma. The charisma of woodpeckers appears to combine with the symbolic association and high profile to create an effective flagship species in Switzerland.

The selection was supported by the results of the quantitative phase, which directly sought to answer research question 2 by measuring whether the reported presence of woodpeckers influences attitudes towards landscape scenarios, which include habitat variables. The higher utility estimates for habitat variables that enhance the likelihood of attracting woodpeckers

suggests that the great spotted woodpecker can be considered to be charismatic. Woodpeckers appear to be, as Entwistle et al. (2000) would suggest is a desirable prerequisite for flagship status, included in the people's sense of place with an inherent right of existence. It appears that the perceived presence of a flagship species in Lucerne and Zurich encourages a more altruistic mindset in that the negative willingness to pay and the utility estimates for infrastructure were less in the woodpecker treatment group than the control group. The result that utility estimates of habitat variables for the woodpecker treatment group are higher than for the control group in all of the samples, with greater increases corresponding to increases in the likelihood of attracting woodpeckers provides clear evidence that flagship species do have the ability to influence public attitudes towards habitat variables, with the clear implication that this can be translated to influencing acceptance of conservation interventions. This acceptance of conservation interventions will be enhanced if the charismatic species also possesses the characteristics of an umbrella species (Peterson, 1988; Meffe & Carroll, 1997; Samways et al., 1995) or of a keystone species (Simberloff, 1998). However, the results of the qualitative interviews suggested that species that are not perceived as charismatic or attractive could sometimes be used as flagship species.

In addressing research question 3, information about the presence of the Clover Stem Weevil also had an effect of increasing the utility estimates of habitat variables in each of the samples. The result that utility estimates returned by the weevil treatment group were higher than those returned by the control groups, and correspondingly higher according to the likelihood of attracting weevils, provides clear evidence that this species can adopt the role of a flagship species. In the cases of Lucerne and Zurich, the difference between the weevil treatment group and the control group was markedly less that the difference between the woodpecker treatment group and the control group, while the weevil had the greater effect in the case of Lugano. It cannot however be concluded, particularly in light of the greater effect of woodpeckers in both Lucerne and Zurich, that flagship species need not be charismatic or that this result thereby challenges the findings of Nentwig et al. (2004), Samways et al. (1995) or Walpole & Leader Williams (2002). Results of the qualitative phase suggested that uncharismatic species can potentially adopt the flagship role in specific and local cases. However, this result was remarkable in the case of Lugano where Meffe & Carroll's (1997) statement that birds will awaken more sympathy than insects was contradicted. A possible explanation for this reversal may be the credibility of the correlation between presence of the species and ecological quality, although further research is required into the influence of the credibility of public information campaigns.

CONCLUSION

Flagship species have been shown, in answer to research question 2, to have the potential to enhance acceptance of habitat preservation and the great spotted woodpecker would be a suitable candidate to be a flagship for projects in Switzerland according to the criteria identified in response to research question 1. The most important design criterion nominated by each organization was that the logo should capture the essence of the organization and thereby inspire the formation of an internal connection with the organization. While the success of flagship species in real world applications has shown that a species with no explicit connection to a population can potentially be used on a general level, the woodpecker's overshadowing by the weevil in Lugano showed that information about the charisma held by a species is essential before its selection as a flagship for local level application. This conclusion underlines the importance, pointed out by conservation organizations during the interviews, of considering the target public when selecting a representative species.

In response to research question 3, it has been shown that less charismatic species may be able to fill the role of a flagship species. The clover stem weevil does not possess the characteristics identified in literature or interviews as a sensible candidate as a flagship species, yet it would be a reasonable choice in Lugano if no other more charismatic species were available. The finding that a non-charismatic species has the potential to fill the role of a flagship when information that it is also an indicator species is provided, allows the hypothesis that the ideal flagship species will be both a charismatic species and an indicator species. This supports the conclusions of Favreau et al. (2006) that the applications with the most efficient results originate from a combination of concepts and it will be the challenge of future research to investigate this further. Although the correlation between the probability of presence of an apparently non-charismatic species and increases in utility estimates suggests that public information has the ability to enhance charisma, further research is required to compare the effects of simple probability of presence with the effects of a combination of presence and information about a link with ecological quality.

These results may be used by conservation organizations to assist in the selection of flagships, and in particular for flagship species that are intended to perform a specific conservation function. To achieve ecological goals, the species chosen as a motivation should be selected specifically for the particular goal and with consideration of the local context.

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CHAPTER 7 SYNTHESIS, OUTLOOK and FINAL CONCLUSIONS

In this synthesis, we will revisit the inductive (pre-hypothesis) phase of the study, which was intended to contribute to the formation of theory to explain the relationship with nature held by residents of Zurich. In light of the framework provided by the developed theory in this specific case, and reviewing relevant literature, research questions were formulated and hypotheses proposed. The research questions and hypotheses then formed the basis of the deductive section of the study, which sought to test the hypotheses in the general population of Switzerland. The conclusions from each of the chapters will be revisited in the second part of this synthesis and their contribution to supporting or rejecting the hypotheses will be discussed.

Naess (1973) maintains that the 'deep' satisfaction that we receive from close partnership with other forms of life in nature contributes significantly to our life quality. Rappe et al. (2006) reported in their study of institutionalised persons that access to nature acts to increase quality of life, Wild-Eck (2002) found that access to nature was of paramount importance to the residents of Zurich, and Papageorgiou et al. (2005) found that quality of the surrounding environment and ecological richness were both contributing factors to quality of life. Miller (2006) similarly commented that proximity to biodiversity also increases quality of life although it appears that this claim was based on intuition rather than observation. Kearney (2006) on the other hand found that access to nature was of less importance than the ability to see nature from the place of residence. While it is clear that nature is important to us and contributes to our quality of life, the required attributes of an urban green space and the degree and type of interaction between people and such spaces that enable them to contribute to quality of life remain unknown. Examining the relationship between urban nature and quality of life, and especially the relative importance of nature, formed the foundation of this research.

In addressing a study such as this, in which little is known about how urban landscapes are perceived, there is a danger that irrelevant constructs may be introduced or that important constructs may be missed. In light of this danger, an exploratory phase of qualitative interviews was carried out using the methods described in detail in chapter 2, to determine what is important for urban residents when they consider urban green spaces. Kelly's (1955/1991), Personal Construct Theory with the associated repertory grid technique proved to be an effective method for learning with which constructs people use to make sense and meaning of urban green spaces, and overcame the problem of finding a shared language.

It was found that urban residents in Swiss cities hold usefulness of urban green spaces to be of key importance and at least equal to the importance of access. An intrinsic valuation of

nature does not appear to exist within the urban context and altruism extends, at most, to consideration of how useful a particular urban green space may be to other people. This has implications for acceptance of biodiversity enhancement measures in that enhancement measures that reduce usefulness to people will not be readily accepted, and conversely, measures that enhance usefulness will be favoured.

However, access remains of considerable importance. This cannot be deduced from behaviour as it is the knowledge that a place is accessible that is important. People do not necessarily go to these places but it is important for them to know that they can. Accessibility has four identified dimensions. Preferred green spaces are legally accessible, they have no physical barriers to access, they have no social barriers to access (such as personal safety), and they are sufficiently nearby that travel does not hinder access. This has similar implications as the findings towards usefulness in that enhancement measures that reduce access by people will not be readily accepted.

This result provides the minimum conditions in answer to the management question: How can the acceptance, by residents of Swiss cities, of measures to maintain and/or improve biodiversity within Swiss cities, be enhanced? Identification of the parameter, that acceptance of enhancement measures relies on them contributing to, or at least not reducing, usefulness to people, while not impinging on public access, forms a key finding of this study. A further implication of this finding is that there appears to be a certain self-interest when considering urban green spaces. This point was explored further in light of the concept of biospheric altruism.

Wilson (1993) proposes an innately, and genetically transferred, emotional affiliation of human beings to other living organisms that would seem, in his eyes, to be a universal human characteristic, which he labels ‘biophilia’. Callicott (1993) interprets Darwin’s theory of evolution as agreeing that biophilia has been naturally selected in our prehuman ancestors as a mechanism for bonding into mutually beneficial communities. Callicott (1993, p.10) asserts that ‘the next stage of human moral evolution’ would be to extend this feeling to ‘fellow members of the biotic community’, or in other words, to develop biospheric altruism.

However, studies of genetic evolution have suggested that altruism is rare in nature. Natural selection tends to advantage the selfish individual and disadvantage the altruist so that altruism can be expected to become even less common. Altruism might be an evolutionary advantage if groups reproduced themselves as a unit, but natural selection acts primarily on individuals (Hardin, 1977). While it is true for most species that altruism is rare and self-interest increases the likelihood of gene transfer, behaviour in people is shaped by culture as well as by genes and experience (Dietz et al., 2005).

(Dietz et al. 2005) point out that social interactions and the cultural context within which we live are clearly influential to how we view the environment. They argue that the observed behaviours of others who live in our communities are likely to have a profound influence on us and can be seen as cultural norms describing appropriate behaviour. Brechbühl and Rey (1998) found that different language regions in Switzerland seem to cope with nature in different ways and that the German speaking part of Switzerland had a greater interest in nature. It can therefore be suspected that differences in worldview may exist between the areas under examination in this study, namely Tessin and Northern Switzerland, and intercultural differences were flagged for further attention. However it is apparent that differences exist within, as well as between, cultures and individual experiences may offer some explanation (Dietz et al., 2005).

If landscape preference were innate, it would merely be a matter of finding the average, and forming urban landscapes to a particular template. However, following a further analysis of the same qualitative interviews described in chapter 2, it is proposed that successful recipes for the landscaping of urban green spaces elsewhere in the world should be used with caution in local contexts. While there are landscape characteristics that are consistently favoured and appear to be preconditioned within us as humans, there also appears to be a cultural component that is based on societal norms, and an individual component that is based on personal preferences and experience. It is therefore confirmed that primary research is needed to answer the management question of how much nature, and in which quality, do urban residents in Switzerland need, in order to perceive an adequate quality of life?

This summary will now revisit the findings of the deductive phases of the study and is structured around the specific research hypotheses. The conclusions of each chapter are revisited here in light of the hypotheses and can be described as further key findings of the project. Justification for the formulation of each research question, and for the hypothesised answers, has been provided in the introduction of this thesis.

Hypothesis 1: An individual's ecological worldview is mediated by culture, knowledge and familiarity with nature
Hypothesis 2: Residents of different regions within Switzerland have different worldviews

It was found that it is very difficult to predict the degree of environmental awareness and concern held by an individual, on the basis of their behaviour, education, age, or cultural background. It appears to be an individual characteristic. Upon examination of hypothesis 1, it was found that the three proposed mediators could not be grouped and treated as three

facets of the same mediator. Culture and familiarity do not appear to be mediating variables, while the finding that members of environmental protection organizations have a higher degree of environmental awareness than non-members offers support, although tenuous, that knowledge is a mediator. An alternative interpretation of course, is that decisions to seek membership of an environmental organization are based upon existing knowledge, which renders the argument circular. Culture and familiarity were found to be not significant predictors of an ecological worldview and therefore no evidence was found using this instrument to support hypothesis 2.

Further questions raised by this study are to the usefulness of the New Ecological Paradigm instrument. Criticisms of the instrument are more fully discussed in chapter 4 of this thesis, where it is explained that answers to some of the items on the scale can only be described as erratic. This result was indeed surprising given the widespread use of the scale in a range of international studies. In light of the questions about the effectiveness of the instrument, it could not be concluded that there are no differences in attitudes towards nature between the various cultural regions of Switzerland, but merely that there are no differences in responses to this scale. The cultural background of respondents became a recurring theme in the analysis of responses to other collected data and is addressed further in chapter 6. Conclusions as to the hypothesised link between ecological world view and the role assigned to urban nature can only be made with confidence if there is trust in the measure of ecological worldview. However this section of the study is worthy of discussion because of the conclusions that can be made about the difficulty of predicting the role of urban nature in the lives of city dwellers.

Hypothesis 3: The ecological worldview held by an individual predicts of the role they assign to urban nature.

This study has shown that people are motivated to visit nearby natural areas by the desire to achieve specific psychosocial outcomes and has identified three categories of outcomes, namely stimulation by nature, escape, and self/other relations. Furthermore, we have shown that people select activities with the aim of achieving multiple outcomes simultaneously. For example, energetic activities are expected to satisfy a need for physical exercise and provide fun outdoors, yet at the same time, are expected to satisfy the need to socialise, in the case of Nordic walking, and the need to self-reflect, in the case of jogging. These results underline the importance of nearby natural areas because of the services they provide to the individual, as well as for the benefits to society that stem from visitation.

Challenges for managers of urban green spaces stem from the finding that there can be no universal recipe for meeting the needs of all publics because different sub populations,

based on both demographics and user groups, have different needs. For example, older people tend to be motivated by the wish to seek social contact while younger people tend to seek restoration. This notion reinforces the findings presented in the inductive phase of the study, that usefulness is a key criteria in the consideration of urban green spaces, and that such spaces tend to be viewed from an egoistic rather than altruistic viewpoint. The question of whether altruism exists when considering urban green spaces is addressed when examining hypotheses 4 and 5. The potential for charismatic and uncharismatic species to enhance appreciation of landscapes that are less useful from an anthropocentric perspective, yet more functional from an ecological perspective was measured using conjoint analysis. The method has been discussed more fully in chapter 6.

Hypothesis 4: Presence of a flagship species enhances appreciation of urban landscapes.
Hypothesis 5: Presence of an uncharismatic species does not enhance appreciation of urban landscapes.

The foundation of the research to examine hypothesis 4 was addressed in the first (nationwide) survey using a choice based experiment when pairs of birds were presented so that one variable could be discerned between them. The analysis consisted of simply observing preferences, and allowing the conclusion that differences were attributable to the discerning variable. It was found that such as species should be colourful, known, local, and be perceived to be compatible with humans. Given the assumption that charisma is inextricably related to preference, these criteria were used to select a species that could be considered charismatic: the greater spotted woodpecker. A more thorough description of what constitutes charisma is provided in chapter 6. Similarly, a species containing none of these characteristics was selected as a counterpoint species: the blue corn weevil. These species were used as ‘treatments’ in a conjoint experiment in the case study cities of Lugano, Luzern, and Zurich.

The presence of the greater spotted woodpecker or the blue corn weevil each had the effect of reducing unwillingness to pay, and increasing the utility estimates of habitats, with the increases linearly related to the likelihood of seeing either creature. In Lucerne and Zurich, the woodpecker had the greater positive effect than the weevil, while in Lugano the weevil had a greater effect than the woodpecker. This suggests that selection of a suitable flagship species is context and case specific. Respondents informed of the likelihood of presence of either species reported greater utility and less unwillingness to pay than members of a control group receiving no additional information.

These findings support hypothesis 4 that presence of a flagship species enhances appreciation of urban landscapes. However they suggest rejection of hypothesis 5 that

presence of an uncharismatic indicator species does not enhance appreciation of urban landscapes. This is not to say that ecological importance adds to charisma. On the contrary, this result demonstrates that the 'pull' of a species that is considered to be of ecological importance can be as great as, or even exceed the 'pull' of a charismatic species. Another interesting finding is that clear differences were found between responses from residents of Lugano and residents form Luzern and Zurich. It is reasonable to assume that these differences are cultural which is an effect that went undetected by the use of the New Ecological Paradigm. There are two consequences of this result. The first is that it provides evidence that either the New Ecological Paradigm is not an effective measure of the ecological worldview or that biospheric altruism is not directly derived from the individual's ecological worldview. However, decades of study into altruism (See chapter 3) suggest that the first variation is more likely. The second consequence is that cultural differences do appear to have a mediating effect on the ecological worldview held by an individual, which therefore provides evidence in support of hypothesis 2. This is relevant to this study in that generalisations cannot be made on the basis of cultural background.

OUTLOOK

While this study has gone some way to answering the management and research questions, a range of additional questions have been unearthed and are presented here in the form of an outlook for future research. Adopting the 'Mumford' attitude towards cities as celebrations of life, and essentially extending a welcome to neophytes and neozoans, is only tenable under the conditions that such exotics do not displace an equal, or even greater number of native species. However, in many cases that is indeed the result. The exotic/native question was not addressed in this study and it will be the challenge of future research to identify public knowledge and attitudes towards newly present species.

While the important attributes that contribute to preferences for urban landscapes were identified in this study, there was only a superficial examination of individual characteristics that may induce differences in preferences. Resource constraints prohibited the analysis of the data in sufficient depth to be able to say whether such differences exist, although the results presented in chapter 3 suggest that they could be expected. Examination of the data in detail will be a task for the future.

The tripartite paradigm presented in chapter 3 was based on a small sample qualitative interviews, and the conclusions have not yet been quantitatively tested. In other words, further research using alternative methods is required to examine the generalizability of these results and, on a larger scale, to contribute to the establishment of an empirical basis for a theory of landscape preferences. In searching for such methods, Balling and Falk's

(1982) approach of examining respondents who have had varying degrees of exposure to, and therefore varying degrees of familiarity with, a particular landscape type appears promising. Van den Berg et al. (1998) adopted a similar approach but warn that applying their findings to the theoretical debate on the biological or cultural origins of landscape evaluations should be undertaken with caution. They wrote that between-group differences in perceived landscape quality might not be the result of specific cultural experiences when groups are self-selected because inherited traits may have motivated members to join the group in the first place (Van den Berg et al., 1998). A possible solution would be to identify groups for which membership is not self-selected, such as immigrant groups sharing a particular ethnic origin, and compare their preferences for urban and natural landscapes with those of the long-term local population. If natural landscapes are indeed more biologically determined and urban landscapes more culturally determined, greater between-group differences could be then expected in preferences for urban landscapes than for natural landscapes.

FINAL CONCLUSIONS

The social sciences module of BiodiverCity addressed the questions of motivations in three phases by assessing preferences for various landscape forms. Firstly, qualitative interviews determined that usefulness, access, and attractiveness are important for urban residents when considering nature. In a second phase, we focussed on nationwide survey, which allowed an assessment of which landscape types are preferred by residents and which elements of those landscapes are important to them. It was found that the dominant criterion for landscape preference in urban environments is vegetational and structural complexity with a preference for more complex landscapes, up to the point when they impinge on usefulness and access. In the final phase, a case study survey was undertaken in the three target cities to determine whether preferences are fixed. It was found that information given about ecological quality of landscape, in the form of likelihood of presence of indicator species, increased preference for landscapes that were believed to be higher quality ecosystems.

Given the requirements of usefulness and access, measures to enhance biodiversity must include the human dimension. An overlap must be found between preferred habitat variables and preferred landscape variables. Furthermore, this overlap is case specific and depends on the needs of the users of a particular space. The space must simultaneously provide a vehicle for their desired outcomes, while providing habitats. These are however not incompatible in that structural and vegetational complexity is the dominant characteristic of favoured landscape configurations. Preference for particular habitats can also be enhanced

by providing information to the public on the ecological benefits of such habitats, such as through the use of flagship species.

To conclude, the factors, which contribute to quality of life, are many and complex however usefulness and accessibility to nature is included in these factors. Structural complexity of the vegetation is a characteristic that is compatible with residents and biodiversity. These characteristics of urban green spaces can be obtained through a mosaic arrangement of different habitat elements of different sizes, forms, and management types.

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